

HexaPOD™ evo RT System; iGUIDE® 2.0



User Manual

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Referenced Documents

Not all documents referred to in this document are part of the scope of delivery for the equipment. Medical Intelligence reserves the right to determine which documents are delivered with a product.

Manufacturer's Address and Contact Information

TECHNICAL SUPPORT HELPDESK – ALL Medical Intelligence PRODUCTS

TEL +49 82 32 96 92 0 – FAX +49 82 32 96 92 800 – mail to: schwabmuenchen@elekta.com

WORLDWIDE PRODUCT MANUFACTURING and SUPPORT CENTER

Manufacturer's Address:

Medical Intelligence Medizintechnik GmbH
Robert-Bosch-Straße 8
86830 Schwabmünchen
GERMANY
www.elekta.com/medint

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When you include a notice in this User Manual, document it in the following table.

Amendment Number	Date	Signature

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1 Before You Begin

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1.1 About this User Manual

The intention of this User Manual is to assist you in the safe and effective operation and maintenance of the HexaPOD evo RT System.

Note: *The contents of the former iGUIDE System User Manual was integrated into this manual.*

Where the term **user** appears in this document, it denotes both the body that has the authority over the equipment and those persons who actually handle the equipment.

- The term **user** means a qualified person who uses any part of the equipment and its accessories for the purpose of treating patients, **and** who has been specifically trained in the safe clinical use of the equipment. Such treatment is restricted to being therapeutic in nature.
- The term **iGUIDE administrator** means a qualified person who performs administration tasks in the clinic as, e.g., managing the iGUIDE software and performing the system calibration.

Always keep this User Manual with the HexaPOD evo RT System for easy reference.

Before you attempt to use the product, always make sure that you read, understand, note and strictly obey all:

- *warnings*
- *safety labels and markings*
- *cautions*
- *notes*
- *important notices*
- *user notices*

Disclaimer

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In order to improve reliability, function or design, Medical Intelligence reserves the right to change the product without notice.

This manual is provided without warranty of any kind, either implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Conventions

Names in examples

Example patient names, physician names and hospital names may be used in this manual. Any resemblance to persons and/or organisations is entirely coincidental.

Warnings, cautions and notes

The following are examples of how *warnings*, *cautions* and *notes* appear throughout this document. The text within the examples explains their purpose.



Warnings are directions. If you do not obey the warnings, you can cause serious injury and/or clinical mistreatment.



Cautions are directions. If you do not obey the cautions, you can cause damage to the equipment, to goods or to the environment.

Note:

Notes provide advice and highlight unusual points.

Accompanying documentation

This manual is part of the accompanying documentation for the HexaPOD evo RT System with iGUIDE 2.0. The complete set of documents for this product is listed below:

- **09-001-1077 HexaPOD evo RT System; iGUIDE 2.0 Planning Guide**
- **09-001-1081 HexaPOD evo RT System; iGUIDE 2.0 Installation Manual**
- **09-001-1078 HexaPOD evo RT System; iGUIDE 2.0 Set-to-Work Manual**
- **09-001-1079 HexaPOD evo RT System; iGUIDE 2.0 Customer Acceptance Test**
- **09-001-1068 HexaPOD evo RT System; iGUIDE 2.0 User Manual**
- **09-001-1074 HexaPOD evo RT System; HexaPOD RT System IEC 62353 Test Documentation**
- **09-001-1080 HexaPOD evo RT System; iGUIDE 2.0 Maintenance Manual**
- **P10105-152 iBEAM evo Couchtop User Manual**
- System Guide for the iGUIDE Tracking System
i.e. Passive Polaris Spectra User Guide, Northern Digital Inc., Waterloo, Canada (www.ndigital.com)

Note that not all features described in this manual apply to the HexaPOD evo system. For warnings, cautions, notes and directives regarding the iGUIDE Tracking System, refer to the System Guide for the iGUIDE Tracking System. In the case of differences, the specifications in the present manual are valid.

1.2 Intended Use of the HexaPOD evo RT System

Intended Use

The HexaPOD evo system is intended to be used for accurate patient positioning within a radiation therapy treatment environment. It comprises of:

- the HexaPOD evo RT Couchtop to support and aid in positioning a patient
- the iGUIDE Software to control the HexaPOD evo RT Couchtop position.

Use of the equipment

The installation, use and operation of this equipment are subject to the law in the jurisdictions in which the equipment is being used. You must only install, use and operate the equipment in such ways that do not conflict with applicable laws, or with regulations which have the force of law. Nothing stated in these documents reduces your professional responsibilities for sound judgement and best practice.

The use of the equipment for purposes other than those intended and expressly stated by Medical Intelligence, as well as incorrect use or operation of the equipment, may relieve Medical Intelligence or their agent of all or some of the responsibility for any resultant non-compliance, damage or injury.

Note:

In the United States, Federal law restricts this equipment to sale, distribution and use by, or on order of, a licensed physician.

Indications

The intended use of the HexaPOD evo system is to support, aid in and control positioning a patient during radiation therapy of various body regions. The system is not restricted to certain sub-populations (e.g., those defined by age, sex, ethnicity, organ function and disease severity or similar).

Contraindications

The HexaPOD evo system is not suitable for human beings with a weight of more than the maximum weight stated on the robotic couchtop, or for veterinary purposes. Due to the construction of the carbon fibre table top, a higher skin-dose has to be considered during planning of treatment, compared to other solutions commercially obtainable.

1.3 Requirements on the User

This User Manual is written for users and iGUIDE administrators of the HexaPOD evo RT System as defined above.

Before you attempt to work with the HexaPOD evo RT System, you **must have** received adequate **training** on its safe and effective use. Training requirements may vary from country to country. Make sure that you receive such training in accordance with local laws, or regulations that have the force of law. Information on training is available from your local Medical Intelligence representative.

1.4 Required Environment

Anaesthetic environment

Do not operate the HexaPOD evo RT System in environments with flammable anaesthetic mixtures.

Environmental conditions

Make sure that the environmental conditions at site comply with the requested conditions as stated in the following tables.



Risk of damage to the equipment. Never exceed the environmental conditions required by the HexaPOD evo RT System.

Transport and storage

Environmental conditions for transport and storage:

Table 1 Conditions for transport and storage

Ambient temperature	-10 °C to +50 °C
Relative humidity	10 % to 90 %
Atmospheric pressure	50 kPa to 106 kPa

Normal use

Standard environmental conditions for normal use:

Table 2 Conditions for normal use

Ambient temperature	+10 °C to +30 °C
Relative humidity	30 % to 75 %, non-condensing
Atmospheric pressure	70 kPa to 106 kPa


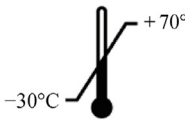

1.5 Labelling

Note: *Not all labels shown here may be applicable for your installation.*

1.5.1 Labelling on the Packaging

You will find the following labels on the packaging:

Table 3 *Labelling on the packaging*

	The labelled equipment must be protected against rain and other forms of splash water.
	Permitted temperature range of the labelled equipment during transportation and storage.
	Correct orientation of the labelled equipment. The arrows always point upwards.

1.5.2 Labelling on the HexaPOD evo RT Couchtop

The symbols and labels described in this section can be found on the robotic couchtop.

Labels regarding Load Conditions

Labels indicating allowable load conditions are located at the T-end of the robotic couchtop.

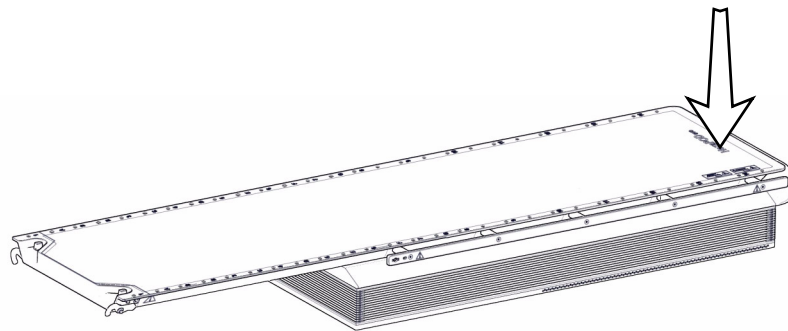


Figure 1 *Location of load condition labels*

Point Load

This label indicates the safe working load at the G-end of the robotic couchtop, if applied as a **point load**:

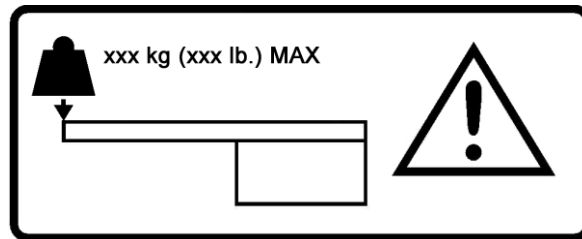


Figure 2 Maximum point load

Distributed Load

This label indicates the safe working load (i.e. the maximum permissible patient weight) of the robotic couchtop, if the load is **distributed evenly**:

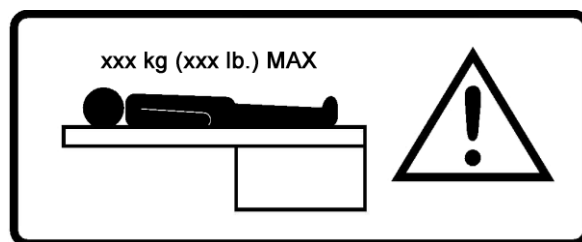


Figure 3 Maximum distributed load



Never exceed the safe working loads specified on the robotic couchtop.

Warning Symbols on the HexaPOD evo RT Couchtop

The following warning symbols can be found on the robotic couchtop:

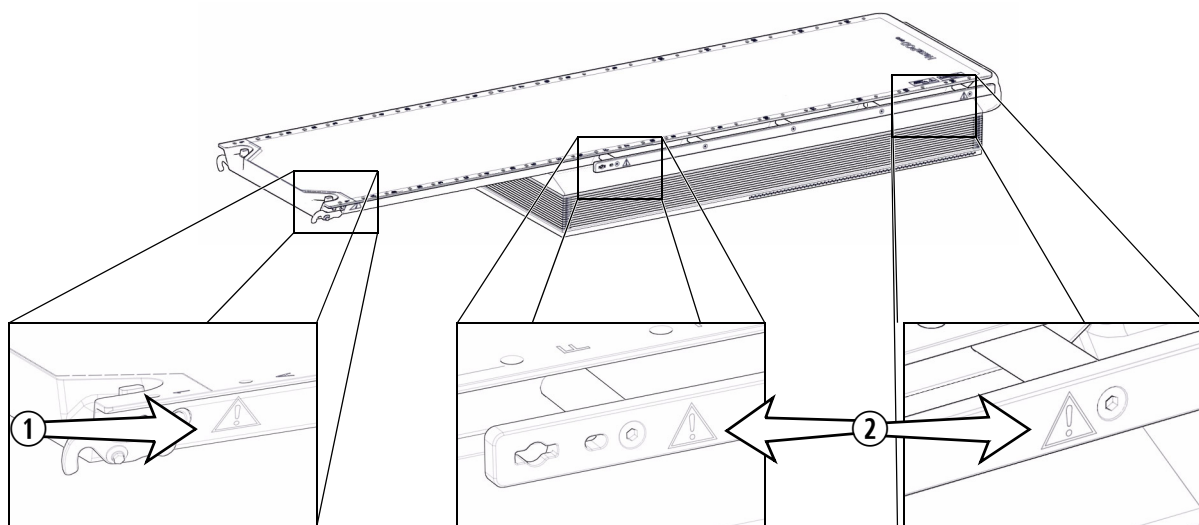


Figure 4 Labels on the robotic couchtop

- ① Indicates that the iBEAM evo Extension must be correctly seated and secured before using the robotic couchtop.
- ② Indicates that the weight limits of the accessory rails must be heeded.



Do not exceed the maximum load of the accessory rails (40 kg; 88 lb).

Device Plate of the HexaPOD evo RT Couchtop

The device plate of the robotic couchtop is located on the T-end.

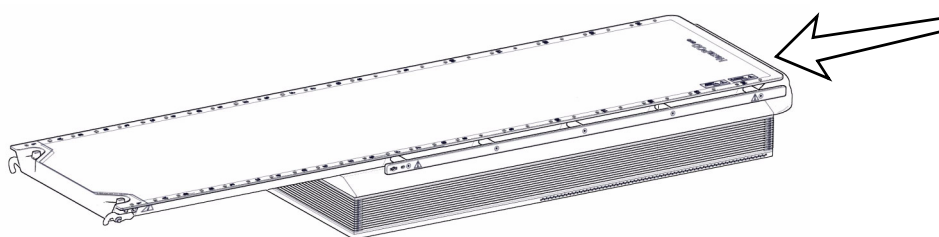


Figure 5 Location of the device plate

The device plate of the robotic couchtop appears as follows:

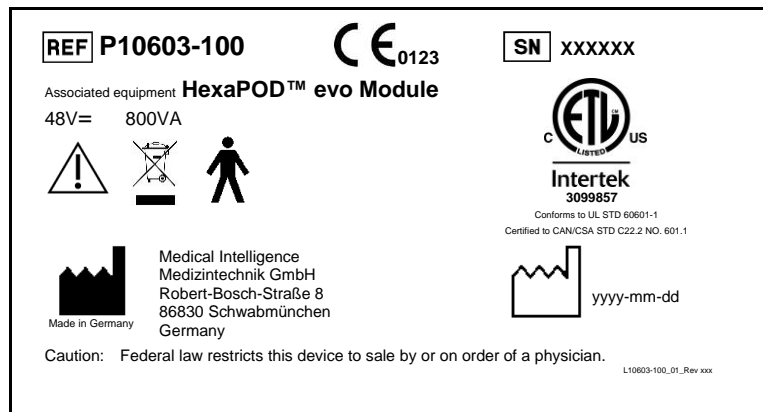


Figure 6 Device plate of the robotic couchtop

Note: The appearance of the label and availability of the symbols may vary.

The symbols on the device plate have the following meaning:

Table 4 Symbols on the device plate



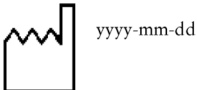






	Specific warning if displayed in conjunction with a warning text. If displayed without a warning text, the user has to refer to the product documentation.
	Manufacturer and the related contact details.
	Date of manufacturing.
	Type B applied parts.
	Product not to be disposed of in the domestic waste stream.
	Product number
	Serial number

Table 4 Symbols on the device plate

	CE marking; see CE marking on page 19
	ETL marking; see ETL marking on page 19

1.6 Compatibility and Compliance

Compatibility

You may only use the HexaPOD evo RT System in combination with other equipment or components if these are expressly recognized by Medical Intelligence as compatible. Consult Medical Intelligence for advice on compatibility with the HexaPOD evo RT System before you use any equipment or components not supplied by Medical Intelligence.

The use of accessories (including cables) other than explicitly approved by the manufacturer may negatively affect the electromagnetic compatibility (increasing emissions or decreasing immunity of the HexaPOD evo system) or may damage the robotic couchtop.

Only perform changes and/or additions to the equipment if you are expressly authorized to do so by Medical Intelligence. Such changes must comply with the safety precautions of [Section 1.7 Safety on page 21](#), best engineering practice, all applicable laws, and all regulations that have the force of law within the jurisdiction.



- **Never make changes, additions or maintenance to the equipment if you do not have appropriate qualifications and training. Never use spare parts that are not supplied or explicitly approved by the manufacturer.**
- **Never install any software on the iGUIDE workstation other than software provided by the manufacturer.**

Compliance

The HexaPOD evo system is designed to comply with internationally recognised standards for safety and performance. These standards are listed below.

Note: *The HexaPOD evo system complies with standards only if it is used in accordance with the intended use, see [Section 2.1 Introduction to the HexaPOD evo RT System on page 29](#).*

CE marking	The HexaPOD evo RT System complies with the <i>Essential Requirements</i> of the EC Directive 93/42/EEC, i.e. MDD and bears the CE marking. Other medical products which are used together with the HexaPOD evo RT System must also bear the CE marking and must be tested according to the corresponding directives.
ETL marking	Where applicable, the components of the HexaPOD evo RT System are ETL listed and bear the ETL mark.

IEC standards

The HexaPOD evo RT System complies with the following IEC standards:

- IEC 60601-1 Medical electrical equipment, Part 1: General requirements for safety
- IEC 60601-1-1 Medical electrical equipment, Part 1: General requirements for safety. Collateral standard: Safety requirements for medical electric systems
- IEC 60601-1-2 Medical electrical equipment, Part 1: General requirements for safety. Collateral standard: Electromagnetic compatibility, Requirements and tests
- IEC 60601-2-1 Medical electrical equipment, Part 2-1: Particular requirements for the safety of electron accelerators in the range of 1 MeV to 50 MeV
- IEC 62304 Medical device software - Software life cycle processes

The iGUIDE Workstation is a non-medical electrical device and complies to

- IEC 60950-1 Information technology equipment, Safety, Part 1: General requirements
- EN 55022 (IEC/CISPR 22) Information technology equipment, Radio disturbance characteristics, Limits and methods of measurement
- EN 55024 (IEC/CISPR 24) Information technology equipment, Immunity characteristics, Limits and methods of measurement

The iGUIDE software is medical software and complies to

- IEC 62304 Medical device software - Software life cycle processes

Classification

According to the IEC standards, the HexaPOD evo RT System is classified as follows:

Table 5 IEC classification of the HexaPOD evo RT System

Type of protection against electric shock	Class I equipment
Degree of protection against electric shock	Type B applied parts
Degree of protection against the ingress of liquids	IPX0 as defined in IEC 60529. Ordinary equipment (enclosed equipment without protection against the ingress of liquids).
Methods of disinfection recommended by the manufacturer	For guidelines on how to clean and disinfect the equipment, see Section 8.13 Cleaning and Disinfecting on page 144 . Not suitable for sterilization.
Degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or with nitrous oxide	This equipment is not suitable for the use in the presence of a flammable anesthetic mixture with air or with oxygen, or with nitrous oxide.
Mode of operation	Suitable for continuous operation

1.7 Safety

Medical Intelligence took every reasonable precaution during manufacture to safeguard the health and safety of the users that operate this equipment. You must obey the precautions listed in this section at all times.

In the case of injury to persons or damage to material, the manufacturer's responsibility, according to the certificates, will no longer apply, if

- you did not obey the safety directions in this section, and/or
- if you used the equipment improperly (i.e. not in accordance with the intended use, see [Section 2.1 Introduction to the HexaPOD evo RT System on page 29](#)).

1.7.1 Important Safety Directions

Medical Intelligence designs all products in order to meet stringent safety standards. All medical electrical equipment requires proper installation, operation, and maintenance (particularly with regard to safety).



WARNING

- **The HexaPOD evo RT System must be operated only by qualified, trained and authorized personnel. The personnel must read and obey all warnings, instructions, and other information in this User Manual.**
- **Never use the HexaPOD evo RT System if you know or if you have any reason to think that any part of the equipment is defective or adjusted incorrectly. Only trained and authorized service personnel is allowed to repair the equipment.**
- **Before you use the HexaPOD evo RT System, always make sure that the daily safety checks were satisfactorily completed and that the planned maintenance was made according to schedule.**
- **Never remove covers or cables from the HexaPOD evo RT System.**
- **If the HexaPOD evo RT System is operated in teams, careful coordination of workflow tasks is necessary.**



CAUTION

Ensure that water or other liquids do not enter any of the components of the HexaPOD evo RT System.

In particular, **before** you attempt to work with the equipment, you must read and be aware of the emergency procedures described in [Section 1.7.3 Emergency Procedures on page 22](#).

Patient fixation

Note:

Medical Intelligence recommends the use of the BodyFIX System for immobilizing patients. The BodyFIX System ensures stable, repeatable positioning.

1.7.2 Safety Features

The HexaPOD evo system has the following safety features:

- Two hands are required to enable movements of the robotic couchtop.
- The robotic couchtop is locked from moving during treatments.
- The robotic couchtop is blocked by Touchguard signals from the Linac.

- Treatments are only possible when the robotic couchtop is in the required position.

Position Guard and **EXTERNAL INHIBIT** signal

The main safety feature of the HexaPOD evo system is the Position Guard. The Position Guard monitors the position of the reference frame and sets the Linac's **EXTERNAL INHIBIT** signal (thus preventing the Linac from radiating) if the reference frame moves unexpectedly.

The Position Guard is active as soon as a fraction is opened. It raises the **EXTERNAL INHIBIT** signal upon opening of a fraction and releases it when the robotic couchtop has reached the treatment position.

The Position Guard will then raise the **EXTERNAL INHIBIT** signal if:

- The table moves out of tolerance. The **EXTERNAL INHIBIT** signal is released when the robotic couchtop moves back to the treatment position.
- The reference frame cannot be seen by the camera. The **EXTERNAL INHIBIT** signal is released when the reference frame is visible again.

1.7.3 Emergency Procedures

You must be thoroughly familiar with all the local emergency procedures and the locations of all emergency buttons and switches, for example:

- The **STOP Motors** button on the Linac table base,
- Any locally installed **Emergency OFF** switches, mounted in the treatment room, the control room, and/or anywhere else in the vicinity of the Linac.

How to release the patient

In case of a power failure, or when you push any **Emergency OFF** button, the robotic couchtop is de-energized and cannot be moved.

In order to release the patient, lower the Linac Precise Table.

1.7.4 Electromagnetic Compatibility (EMC) and Mobile Phones

The HexaPOD evo system is compliant with the requirements of the applicable EMC standards as described in the list of the applied standards (see [Section IEC standards on page 20](#)). The data of the EMC test report can be found in the Appendix of this User Manual (see [Appendix A](#)).

The HexaPOD evo system requires special precautions regarding EMC and must be installed and put into service in accordance with the information provided in the relevant product documentation.

Other electronic devices exceeding the limits defined in such EMC standards, such as mobile phones or diathermy units, may possibly lead to malfunctions and can influence the safe operation of the HexaPOD evo system. It is your responsibility to make sure that mobile phones and other devices that transmit radio frequency are not allowed and not used in the vicinity of the HexaPOD evo system. The Appendix of this User Manual informs you about the minimum separation distances between the components of the HexaPOD evo system and such transmitting devices (see [Appendix A](#)).



WARNING

Do not allow any radio-transmitting devices exceeding the limits defined in the EMC standard (such as mobile phones, diathermy units, etc.) in the vicinity of the HexaPOD evo RT System. If other devices are present in the vicinity of the HexaPOD evo RT System, the user should check that its intended use is not affected.

1.8 IEC 62353 Test

The standard **IEC 62353 Medical Electrical Equipment - recurrent test and test after repair of medical electrical equipment** defines requirements to ensure the in-service electrical safety of electromedical equipment and systems. The tests defined in IEC 62353 are a measure for establishing the safety of an active, non-implantable medical device. The goal is the early recognition of device deficiencies and the risks for patients, users or third parties.

The technical safety of the medical device shall be tested according to IEC 62353. National laws or regulations for testing the technical safety of medical devices must also be heeded.

According to IEC 62353, medical devices are to be tested at the following intervals

- before putting into service
- recurrent test (once a year)
- after repair

The IEC 62353 Test covers the following points:

- **Inspection:** Is there any visible damage to the medical device?
- **Electrical measurements:** Is the electrical safety of the medical device ensured?
- **Functional test:** Does the medical device function as required?
- **Safety:** Do the safety precautions of the medical device function correctly?
- **Evaluation:** Can the medical device be used?

See **09-001-1074 HexaPOD evo RT System; HexaPOD RT System IEC 62353 Test Documentation**.

Depending on the location of the medical equipment, national regulations may require technical safety testing of medical equipment upon installation, after any service or repairs and at regular intervals. Such testing is the responsibility of the entity accountable for the use and maintenance of the medical equipment. The entity accountable can be, for example, a hospital or an individual clinician.

If specific national regulations do not exist, it is recommended to use the standard IEC 62353 as the basis for the electrical testing.

1.9 Glossary

Term	Also referred to as	Description
Alignment Check	—	Verifies that the HexaPOD evo RT System can position the iGUIDE Reference Frame in the room lasers.
ENABLE Buttons	—	Buttons on the Handheld Controller for enabling movements.
EnableSwitch Board	ESB	The control unit in the treatment room; the LEDs provide an overview of the status of the HexaPOD evo RT System. The OPERATE buttons allow you to enable HexaPOD evo RT Couchtop movements from the treatment room.
EXTERNAL INHIBIT LED	—	LED on the EnableSwitch Board that indicates that the HexaPOD evo RT System is preventing the Linac from releasing radiation.

Term	Also referred to as	Description
EXTERNAL INHIBIT Signal	—	Used by the HexaPOD evo RT System, Identify IO System and other equipment to prevent the Linac from releasing radiation.
Handheld Controller	HHC	The control unit mounted to the HexaPOD evo RT Couchtop.
HexaPOD evo RT Couchtop	robotic couchtop	The HexaPOD evo RT Couchtop can position the patient under the treatment beam with six degrees of freedom.
HexaPOD evo RT System	HexaPOD evo system	The complete system for patient positioning: HexaPOD evo RT Couchtop, iGUIDE Tracking System, iGUIDE Reference Frame, iGUIDE software and workstation.
HexaPOD OFF Button	—	Used to switch off the HexaPOD evo RT Couchtop.
HexaPOD ON Button	—	Used to switch on the HexaPOD evo RT Couchtop.
HexaPOD ON LED	—	Indicates that the HexaPOD evo RT Couchtop has been switched on.
iGUIDE Calibration Tool	calibration tool	Tool used for calibrating the HexaPOD evo RT System to the XVI system.
iGUIDE Key	—	For enabling/disabling the HexaPOD evo RT System. When disabled, the HexaPOD evo RT System does not set the EXTERNAL INHIBIT signal.
iGUIDE Reference Frame	reference frame	A carbon-fiber frame, equipped with infrared-reflective markers used for calculating the position of the HexaPOD evo RT Couchtop.
iGUIDE Terminal	—	The monitor, keyboard and mouse in the treatment room.
iGUIDE Tracking System	camera	Monitors the position of the iGUIDE Reference Frame or iGUIDE Calibration Tool.
iGUIDE Workstation	—	The PC on which the iGUIDE software runs.
LINAC READY LED	—	LED on the EnableSwitch Board that indicates that no equipment is inhibiting HexaPOD evo RT Couchtop movements.
LOAD Button	—	Button on the HexaPOD evo RT Couchtop control panel for requesting a movement to the LOAD position.
LOAD Position	—	The lowest position of the HexaPOD evo RT Couchtop.
MOVEMENT PENDING LED	—	LED on the EnableSwitch Board and Handheld Controller that indicates when a movement command has been sent to the HexaPOD evo RT Couchtop.

Term	Also referred to as	Description
OPERATE Button	—	Button on the Handheld Controller for enabling a pending movement.
OPERATE Buttons	—	Buttons on the EnableSwitch Board for enabling movements.
Positional Error	PE	Used to position the treatment site exactly into isocenter. The PE values are provided by the imaging system.
POWER LED	—	Indicates that the HexaPOD evo RT Couchtop is getting power.
Relative Table Movements	RTMs	Used to position the treatment site roughly into isocenter from a known position (for example, markers on the skin).
ROT/TRANS Button	—	Switches between rotational and translational modes.
ROT/TRANS LED	—	Indicates if rotational mode is active.
Signal Interface	—	Contains (in combination with the interlock PCB) the switching logic for enabling movements of the HexaPOD evo RT Couchtop. Also sets the EXTERNAL INHIBIT signal, which prevents the Linac from releasing radiation.
START Position	—	The position in which the HexaPOD evo RT Couchtop has the largest range of movement.
System Calibration	—	The procedure for aligning the isocenter of the HexaPOD evo RT System to the XVI isocenter (also known as set-to-work).
TREATMENT BEAM LED	—	LED on the EnableSwitch Board that indicates when the Linac is radiating.
TREATMENT BEAM Signal	—	The Linac sets this signal to high during radiation. The HexaPOD evo RT System locks the HexaPOD evo RT Couchtop from moving when this signal is active.

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2 Overview of the HexaPOD evo RT System

Section	Title	Page
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2.2	Components of the HexaPOD evo RT System	30
2.3	Principal Workflow	31
2.4	Coordinate Systems Used by the iGUIDE Software.....	32
2.5	How the HexaPOD evo RT System Positions Patients.....	34

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2.1 Introduction to the HexaPOD evo RT System

Short description

The HexaPOD evo RT System is a unique fully robotic patient positioning system. It allows the clinical user to remotely correct for misalignments of the patient not only along the traditional translational axes, but also for roll, pitch and yaw (rotational X, Y, Z). The 6 degrees of freedom given by the robotic couchtop allow the user to reposition the patient in any direction within sub millimeter accuracy.



Figure 7 HexaPOD evo RT System

- ① iGUIDE Tracking System
- ② HexaPOD evo RT Couchtop
- ③ iGUIDE Reference Frame

HexaPOD evo RT Couchtop

The robotic couchtop is a 6-axis radiotherapy treatment table that accurately positions the patient for treatment delivery in all translational and rotational axes. It is designed to replace the couch tops of RT systems like:

- Elekta Precise Treatment System with Precise Table
- Elekta Synergy Platform with Precise Table
- Elekta Synergy S, and Elekta Axesse with Precise Table

The robotic couchtop features a robotic patient-positioning platform with six degrees of freedom. It enables accurate and remote correction of any misalignments detected by state-of-the-art image guidance systems, thereby closing the gap in the 6DOF-chain of IGRT localisation and tumour isocentre targeting.

iGUIDE Tracking System and iGUIDE software

The iGUIDE Tracking System along with the iGUIDE software controls the robotic couchtop and validates the table position. The high-precision camera tracks the markers on the reference frame in real time, making it possible to calculate the position of the robotic couchtop and patient.

2.2 Components of the HexaPOD evo RT System

The following figure shows all components of a HexaPOD evo system. The components are divided into the rooms where they are located.

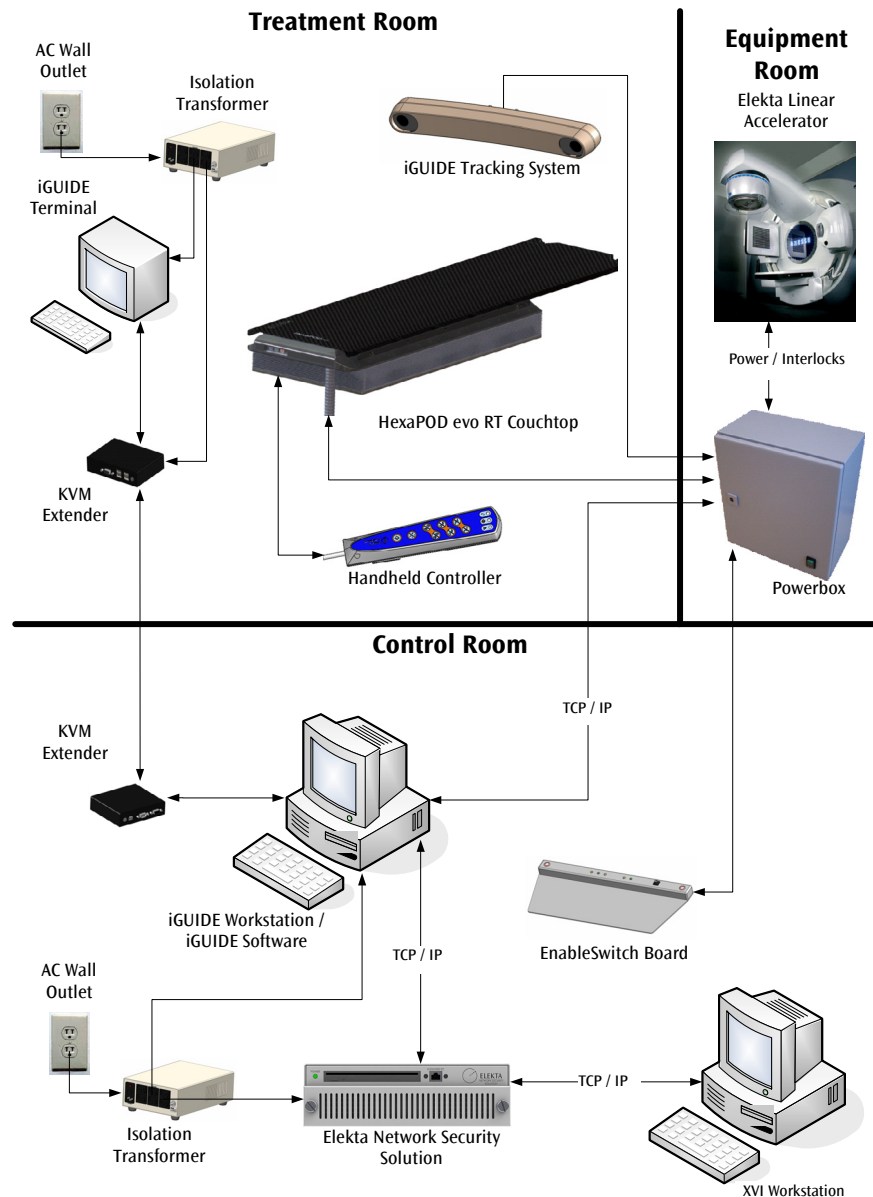


Figure 8 The components of the HexaPOD evo system

For additional information on the components, please refer to [Chapter 8 Description of the System Components on page 125](#)

2.3

Principal Workflow

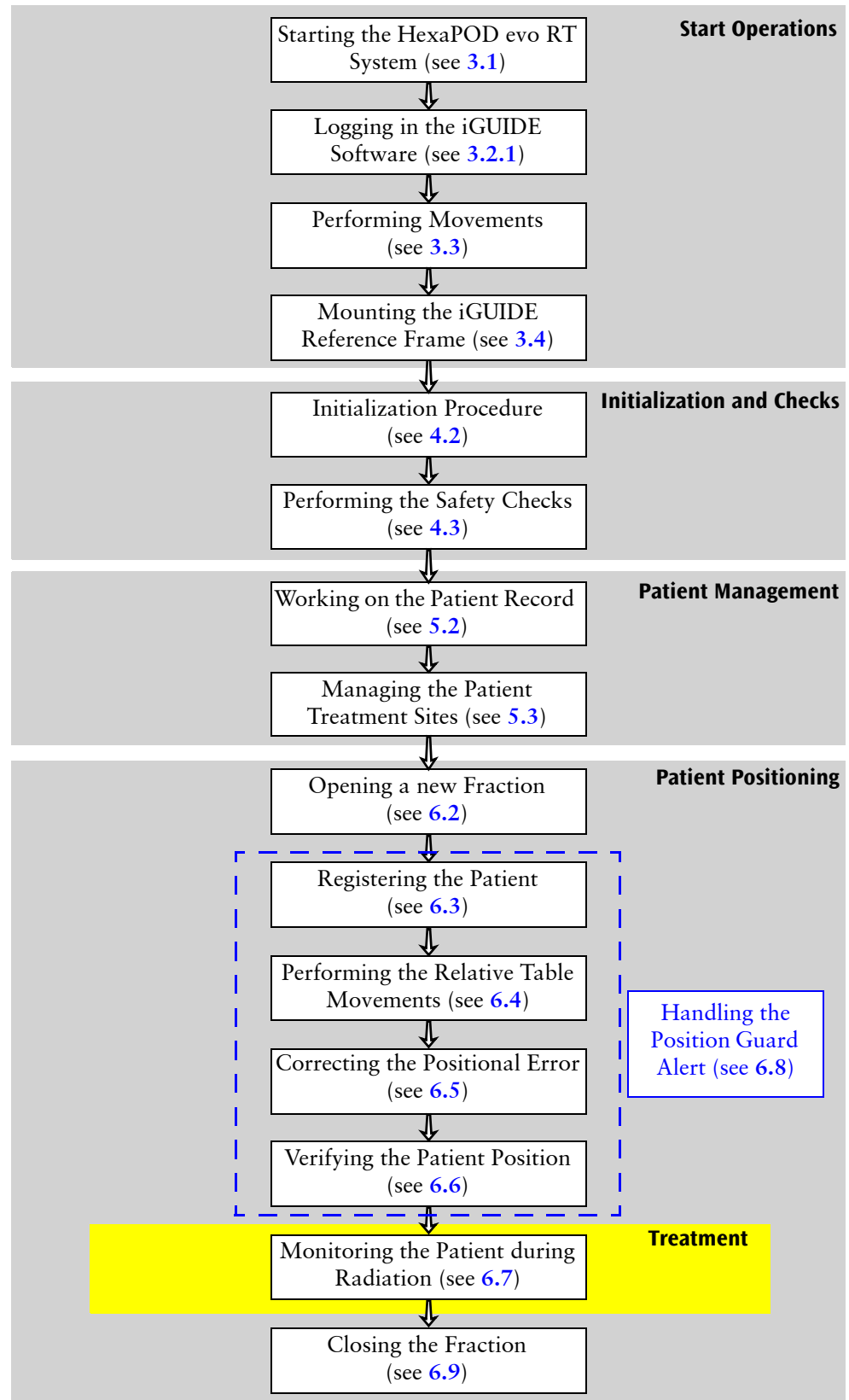


Figure 9 Principal workflow

2.4 Coordinate Systems Used by the iGUIDE Software

Different coordinate systems are used by the iGUIDE software to match to the coordinate system of the Linac and the treatment planning system.

iGUIDE software
coordinate
systems for RTM

In order to avoid misunderstandings and possible clinical mistreatment, it is vital that the treatment planning system, the iGUIDE software and the Linac use the same coordinate system. The iGUIDE software can be configured in either the EN 61217 coordinate system or the EN 60601 coordinate system (refer to [Section 7.6.6 Configuring the HexaPOD evo RT System on page 117](#)). The configuration setting cannot be changed by an operator.

The coordinate system currently being used by the iGUIDE software is displayed context-sensitively on the GUI. In the following example the **IEC61217 Coordinate System** is used for the RTMs and is displayed below its values:

Relative Table Movement

TX: cm TY: cm TZ: cm
IEC61217 Coordinate System

Figure 10 Coordinate system button below the RTM values

If you click on it, you will get a 3D view of the respective coordinate system:

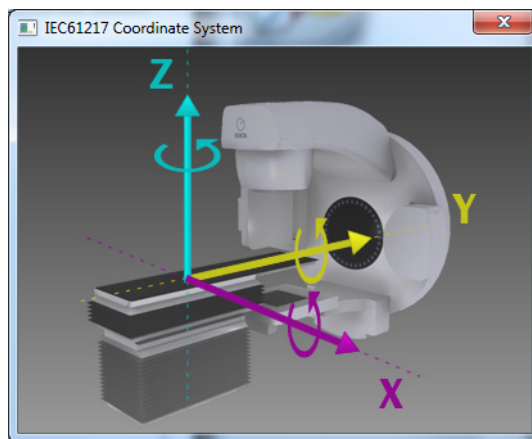


Figure 11 Display of the coordinate system according to EN 61217

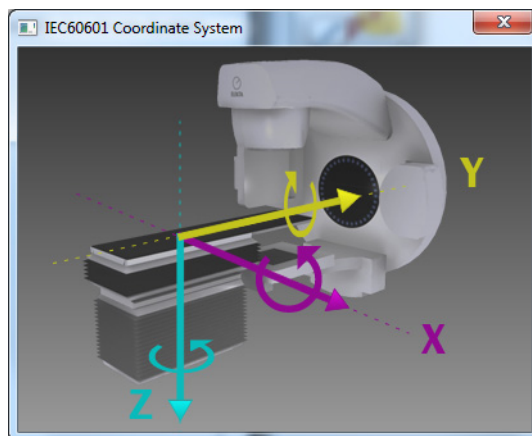


Figure 12 Display of the coordinate system according to EN 60601

XVI coordinate system for PEC

The XVI coordinate system that is used for PE correction is different to both the EN 60601 and the EN 61217 coordinate system, see [Section 6.5 Correcting the Positional Error on page 87](#).

For PE correction the coordinate system cannot be configured. The iGUIDE software is adapted to the XVI coordinate system.

This coordinate system can be displayed by clicking on the **Synergy Coordinate System** button.

Positional Error				
	Translation [cm]		Rotation [deg]	
	Set Value	Actual Value	Set Value	Actual Value
X	0.30	0.30	1.30	1.30
Y	-0.12	-0.13	359.10	359.10
Z	0.02	0.02	0.60	0.60

Synergy Coordinate System

Figure 13 Coordinate system button below the Positional Error values

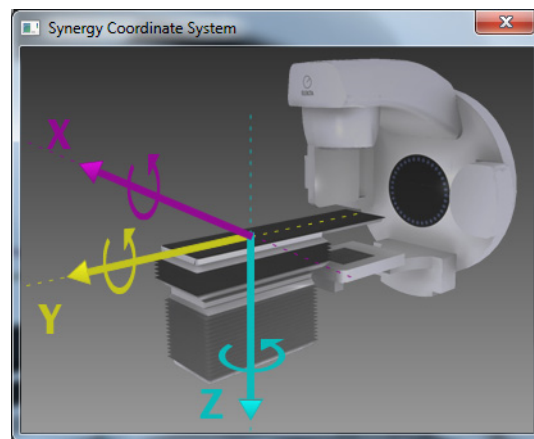


Figure 14 Display of the coordinate system according to Synergy CS

To remove the display of the coordinate system, click **Synergy Coordinate System** again.

2.5 How the HexaPOD evo RT System Positions Patients

The HexaPOD evo system is designed for sub-millimeter exact patient positioning for radiotherapeutical treatments.

The HexaPOD evo system uses *Relative Table Movements* (RTMs) to move to a treatment target that does not match external markings.

It uses *Positional Error* (PE) values from an external measurement system such as XVI to position the treatment target so that it is exactly oriented at the isocenter as defined by the treatment planning system.

The *Position Guard* monitors the position of the reference frame and notifies you in case of changes. The Position Guard prevents the Linac from radiating if the reference frame has moved.

What are RTMs?

In some cases, the desired treatment isocenter as calculated by the treatment planning system will not match the external markings on the patient's skin or stabilization devices (such as a thermoplastic shell). To reach the treatment isocenter from these markings, shifts as calculated by the treatment planning system are required. These shifts are referred to in the iGUIDE software as *Relative Table Movements* (RTMs).

When you set up a treatment site for a patient in the iGUIDE software, you define the RTMs as provided by the treatment planning system.

When you prepare a patient for a treatment fraction:

- You first fixate the patient on the robotic couchtop.
- You then move the robotic couchtop so that the markings are aligned with the lasers.
- You register the current position in the iGUIDE software.
- The iGUIDE software moves the robotic couchtop according to the RTMs for the treatment site.

The treatment target will now *approximately* be at the isocenter. An XVI scan can be performed to calculate how the robotic couchtop must be moved to bring the treatment target to the position and orientation defined by the treatment planning system.

Configuring RTMs in the iGUIDE software

The iGUIDE administrator has the following choices for configuring RTMs:

- RTMs can be activated or deactivated. When deactivated, it is not necessary to define RTMs when setting up treatments.
- The coordinate system used for RTMs can be defined. This must match the coordinate system of the treatment planning system.

See [Section 7.6.6 Configuring the HexaPOD evo RT System on page 117](#) for further information.

What are PE Values?

When a patient is positioned, the position and orientation of the treatment target can only be approximated. To get the exact position, an imaging system (such as XVI) is required.

The imaging system scans the volume around the isocenter and then reconstructs it. The positional offsets between the reconstructed volume and the volume used for planning are calculated. These are the **Positional Error** (PE) values.

The PE values are transferred to the iGUIDE software (automatically or manually, depending on the system configuration). The iGUIDE software translates the PE values into movement commands for the robotic couchtop. The operator then performs an automatic remote table move so that the treatment target is oriented as required at the isocenter.

What is the Position Guard?

The Position Guard is a major security feature of the HexaPOD evo system. It monitors the position of the reference frame and generates an alert (the Position Guard Alert) if the position of the reference frame has been changed or if the reference frame can no longer be tracked (which can occur if a marker is not in view of the camera).

When you register a patient in the iGUIDE software, the iGUIDE software uses the current position of the reference frame as the registered position. If the reference frame moves unexpectedly, the Position Guard Alert is shown.

During
irradiation

During irradiation, the Linac generates the **TREATMENT BEAM** signal. When this signal is active, the iGUIDE software (including Position Guard) is inactive. Changes in the position of the reference frame will be first noticed when irradiation stops and the **TREATMENT BEAM** signal is no longer active.

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3 Operating the HexaPOD evo RT System

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3.3	Performing Movements	45
3.4	Mounting the iGUIDE Reference Frame	49

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3.1 Starting the HexaPOD evo RT System



Do not touch the patient while touching one of the connectors on the robotic couchtop.

3.1.1 Switching on the HexaPOD Powerbox

The robotic couchtop and camera are powered from the powerbox in the equipment room.

To switch on the powerbox, push its mains switch (for details, refer to [Section 8.2 HexaPOD Powerbox on page 127](#)). The green check-back light will come on. If the green check-back light does not come on, call a service engineer.

Note: The powerbox is only powered if the Linac power is ON.

3.1.2 Checking the Status of the iGUIDE Tracking System

The camera will automatically start when you switch on the powerbox. The LEDs on the camera show you its status:

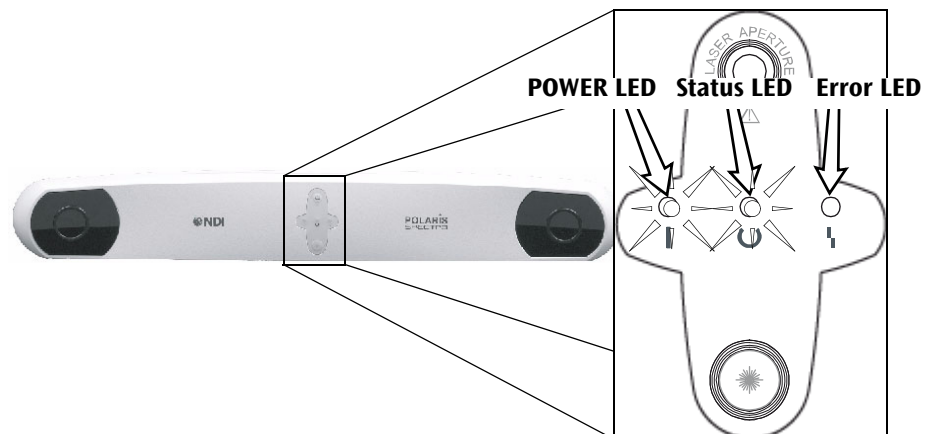


Figure 15 iGUIDE Tracking System (Polaris Spectra)

The **POWER** LED and the **Status** LED must be lit up. Note that after switching on, the **POWER** LED will flash. You have to wait 30 minutes to ensure that the camera is warmed up completely.

- **When you work with the HexaPOD evo RT System, make sure that there are no other optical markers (for example, a second reference frame) are within the field of view of the camera.**
- **Make sure that the camera is powered for at least 30 minutes before you perform the daily safety checks.**
- **The camera uses IR light for tracking. Ensure that all other light sources and objects that point or reflect light at the camera are removed or disabled while you work with the iGUIDE software. Other optical tracking systems must also be disabled.**



3.1.3 Switching on and off the HexaPOD evo RT Couchtop

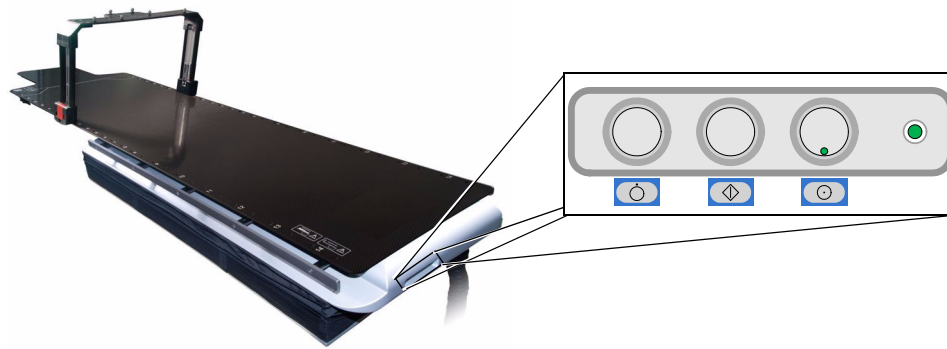


Figure 16 The HexaPOD evo RT Couchtop with control panel

Starting up the HexaPOD evo RT Couchtop

When you switch on the powerbox, the **POWER** LED will light up.

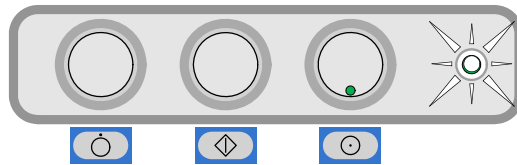


Figure 17 **POWER** LED lights up

Press the **HexaPOD ON** button for ~3 seconds to start the robotic couchtop.

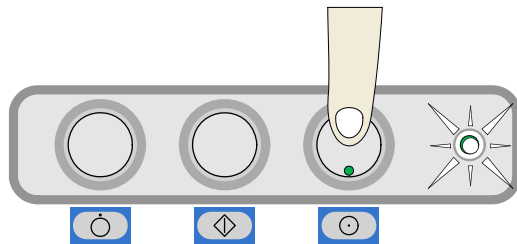


Figure 18 Switching on the HexaPOD evo RT Couchtop

The **HexaPOD ON** LED will light up. After ~20 seconds, you will hear a click from the robotic couchtop. (This indicates that it has finished booting.)

Shutting down the HexaPOD evo RT Couchtop

Press and hold the **HexaPOD OFF** button for ~4 seconds.

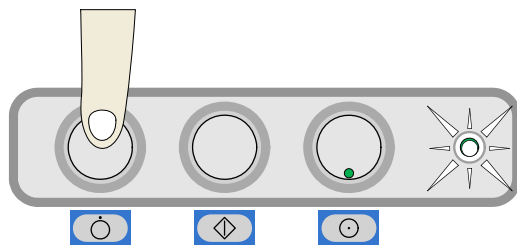


Figure 19 HexaPOD OFF Button

The robotic couchtop shuts down, the **HexaPOD ON** LED goes off.

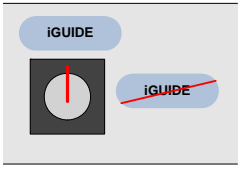
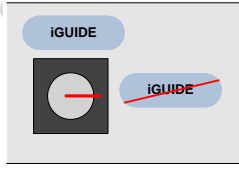
3.2 Operating the iGUIDE Software

3.2.1 Starting and Shutting Down the iGUIDE Software

Using the iGUIDE Key

With the **iGUIDE** key you can activate and deactivate the iGUIDE software.

Table 7 Function of the iGUIDE Key

Position of the key	Description
	iGUIDE ON (12 o'clock): The iGUIDE software is active. Before you start the iGUIDE workstation, the key has to be switched to this position.
	iGUIDE OFF (3 o'clock): The iGUIDE software is inactive. The HexaPOD evo system will not be used for patient positioning and monitoring. In this position, the HexaPOD evo system cannot set the EXTERNAL INHIBIT signal. Move the iGUIDE key to this position to shut down the iGUIDE software.

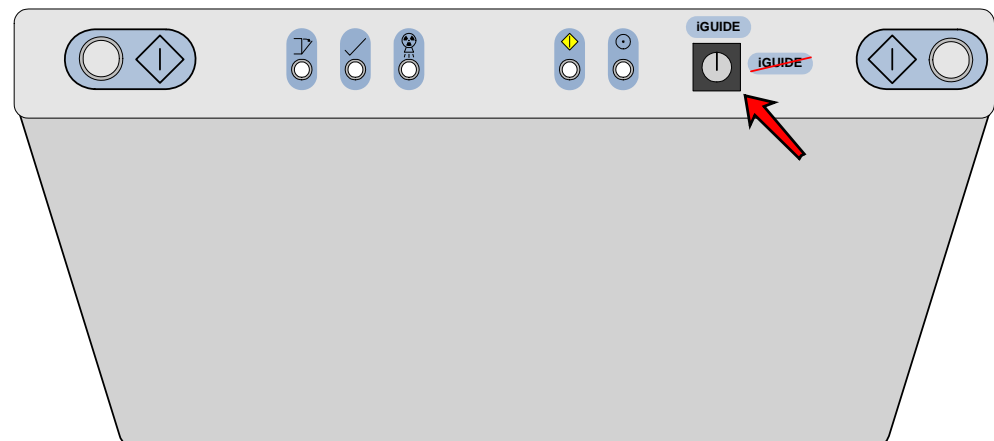


Figure 20 Location of the iGUIDE Key on the EnableSwitch Board

Note:

For a description of the **EXTERNAL INHIBIT** signal, please refer to [Section 1.7.2 Safety Features on page 21](#).

Logging into the iGUIDE Software

When you switch on the iGUIDE workstation, the iGUIDE software starts automatically and the login window appears. Enter your user name and password.



Figure 21 The login window of the iGUIDE software

The first time that the iGUIDE software is started daily, the **System Overview** window will be displayed (see [Section 4.1 The System Overview Window on page 53](#)). From this window the daily safety checks can be run. Subsequent logins will take you directly to the **Patients** window (see [Section 5.1 The Patients Window on page 63](#)).

Note: *If, for any reason, the iGUIDE software does not start, then you will see the login window of the operating system. Log in as user iGUIDE. Do not enter any password.*

Note: *If you have to contact your service representative, they will require the version of iGuide that you are running. You can find this in the login window (see above).*

Using the iGUIDE Key to perform treatment without the HexaPOD evo RT System

If the HexaPOD evo system will not be used during a treatment, it is strongly recommended to disable the iGUIDE software. At any time, it is possible to log off the iGUIDE software manually.

To do so, turn the **iGUIDE** key into its 3 o'clock position.

Shutting down the iGUIDE Software

At the end of the day or if the iGUIDE software has hung, turn the **iGUIDE** key to **iGUIDE OFF**. The login window appears.

Click **Exit** to leave the iGUIDE software. Then you will see the login window of the operating system where you can shut down the system.




3.2.2

iGUIDE Software Main Windows

The graphical user interface of the iGUIDE software has a given structure. On the left side, the different windows are displayed, on the right side, the window buttons and several main functions are displayed and may be selected.

The windows are dedicated to specific tasks are provided by the iGUIDE software:

Table 8 The main windows of the iGUIDE software

Window	Description
System Overview	<p>In the System Overview window, you can view the status of the HexaPOD evo system components and prepare the HexaPOD evo system for operation.</p> <p>This includes the safety checks that you must perform daily before you do any treatment.</p> <p>Click  to open the window.</p> <p>For a detailed description of the System Overview window and its functions, refer to Section 4.1 The System Overview Window on page 53.</p>
Patients	<p>In the Patients window, you can manage patient and treatment data.</p> <p>Click  to open the window.</p> <p>For a detailed description of the Patients window and its functions, refer to Section 5.1 The Patients Window on page 63.</p>
Positioning	<p>In the Positioning window, you can move and control the robotic couchtop to the final intended position for treatment.</p> <p>You open the Positioning window by clicking the Open Fraction for Positioning button after you have selected a treatment site in the Patients window.</p> <p><i>Note:</i> The  button is not clickable.</p> <p>For a detailed description of the Positioning window and its functions, refer to Section 6.1 The Positioning Window on page 81.</p>

3.2.3 Capturing a Screenshot for Error Reporting

In the case of troubles you can create a screenshot by pressing the Print Screen key on the keyboard.

A dialog box will be opened where you can see the screenshot and should enter your comments.

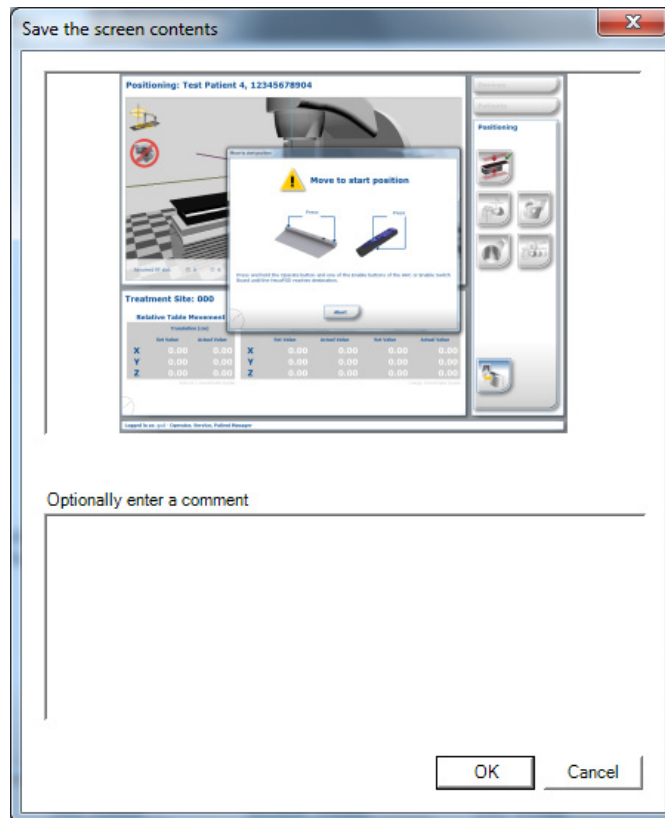


Figure 22 Screenshot for troubleshooting

After clicking **OK**, the screenshot is saved. Notify the iGUIDE administrator.

3.3 Performing Movements

During a normal workflow or in the warm up procedures for iGUIDE software, corrections to the table position may require a combination of movements, both of the robotic couchtop and the Linac Precise table. If the movement is within the range of the robotic couchtop, the user will be immediately asked to enable the movement (see [Section 3.3.2 Enabling HexaPOD evo RT Couchtop Movements on page 46](#)). If the move required is outside this range, then the user will be prompted to initially move the Linac Precise table (see below) and then enable the robotic couchtop.

Always pay attention to the robotic couchtop when performing movements to:

- avoid collisions,
- immediately stop unintended movements, or
- immediately stop movements that can be of danger to the patient or treatment personnel.

Note:

Release the enable buttons to stop the robotic couchtop immediately.



Always monitor the robotic couchtop, anytime you move it, regardless of whether you do so locally from the HHC or remotely from the control room. Ensure that neither patient nor robotic couchtop touch any surrounding equipment.

3.3.1 Moving the Linac Precise Table

If the robotic couchtop cannot reach a target position from the current position, a dialog box will appear, informing you how the Precise Table must be moved.

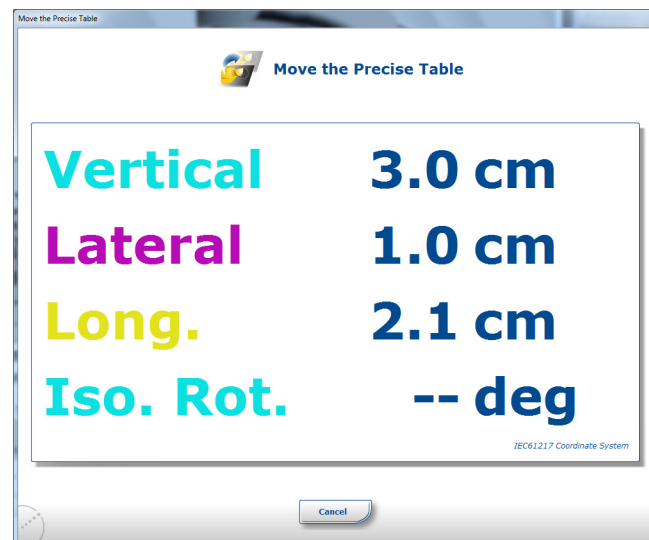


Figure 23 Manual Precise Table rotations and moves requested

When the robotic couchtop has reached the target position, the dialog box will close.

3.3.2 Enabling HexaPOD evo RT Couchtop Movements



Never enable movements of the robotic couchtop while imaging is in progress.

Movements of the robotic couchtop must be enabled with either the ESB or HHC before they can be carried out. The following dialog box appears when a movement of the robotic couchtop is required.



Figure 24 Dialog when movements required

The **MOVEMENT PENDING** LEDs on the ESB and HHC also indicate when a movement of the robotic couchtop is required.

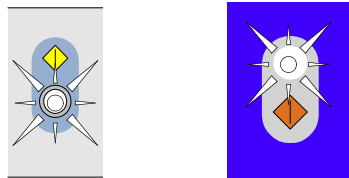


Figure 25 MOVEMENT PENDING LEDs

You can enable movements from the control room by pressing and holding the **OPERATE** buttons on the ESB until the movement is complete (and the **MOVEMENT PENDING** LED goes out).



Figure 26 Enabling movements

In the treatment room, press and hold the **ENABLE** buttons and the **OPERATE** button on the HHC until the movement is complete (and the **MOVEMENT PENDING** LED goes out).

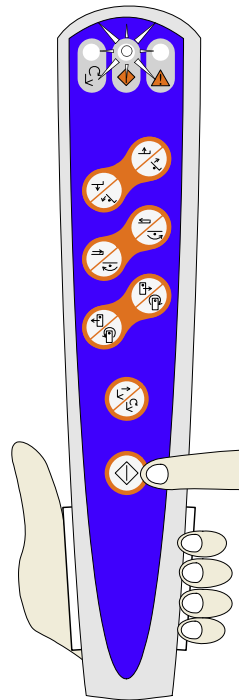


Figure 27 Enabling movements

Never move the robotic couchtop

- 1 simultaneously with the Linac table base,
- 2 while any other equipment in the treatment room moves (e.g. the gantry),
- 3 while any other action takes place in the treatment room (e.g. the exchange of accessories),
- 4 when an electron applicator or a shadow tray is mounted to the gantry head. The electron applicator or shadow tray considerably extend from the gantry head and thus put the Touchguard out of action,
- 5 if the projected movement path of the robotic couchtop is blocked (e.g. by the gantry or by gantry attachments).



Only one person may control the HexaPOD evo RT System and its components at one time. Treatment personnel in the treatment room must have priority. Do not perform movements of the robotic couchtop from the control room until all treatment personnel has left the treatment room.

Troubleshooting The following dialog box may appear in some cases:

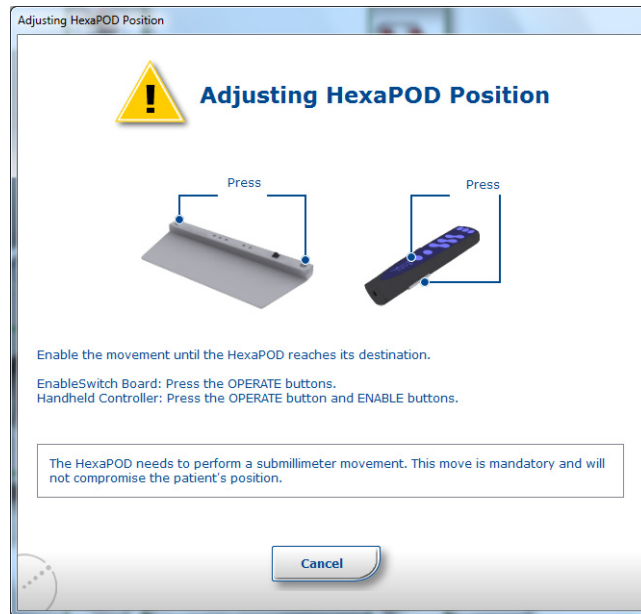


Figure 28 Adjusting robotic couchtop position

In this case you have to click the required buttons and the robotic couchtop is moved slightly. Then the dialog box disappears.

3.4 Mounting the iGUIDE Reference Frame

The reference frame is used to track the position of the robotic couptop during treatments. It is clamped to both sides of the robotic couptop.

Mount the reference frame in the desired slot (slots A – G are available) and secure it (for details, refer to [Section 8.8 iGUIDE Reference Frame on page 140](#)). Place the reference frame as close to the isocentre as possible without obstructing the treatment fields, obscuring the view of the camera on the reference frame or causing a collision with any part of the machine.

Note:

The reference frame can only be secured onto the robotic couptop in the correct direction due to slightly different circumferences of the indexing hole. If you try and force the frame on the robotic couptop in the wrong direction then this can damage the reference frame or the tabletop.

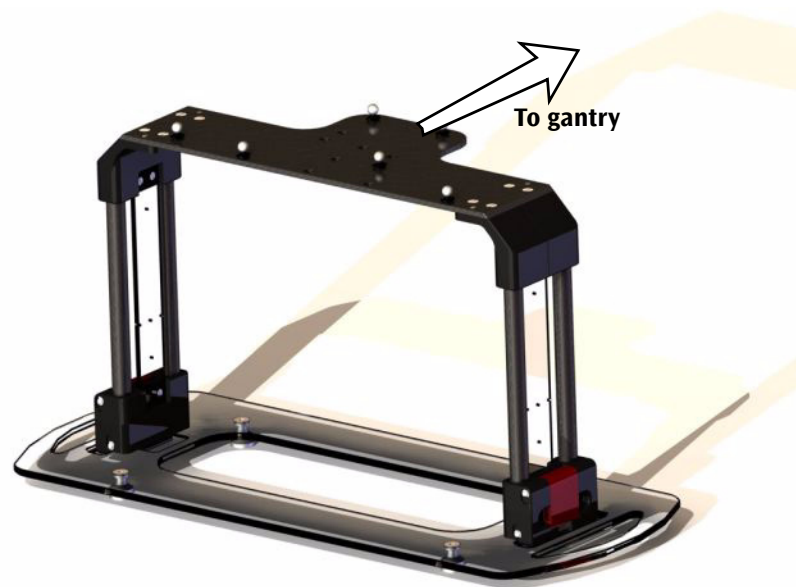


Figure 29 iGUIDE Reference Frame



- **Always make sure that the reference frame is mounted correctly and the mounting system is firmly locked.**
- **Do not touch, drop or otherwise damage the optical markers.**
- **Do not mount the reference frame so that it is more than 50 cm from isocenter during positioning.**

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4

Performing Initialization and Safety Checks

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4.1 The System Overview Window

Note:

The tasks described in this chapter cover all items of the Daily QA procedure. These procedures are mandatory before using the iGUIDE software on a daily basis.

The **System Overview** window contains all the functions that you need in order to make the system ready for treatment. From this window, you have direct access to the safety checks that you must perform daily before any treatment.

The **System Overview** window is opened when the HexaPOD evo system starts for the first time in the day (see [Section 3.2.1 Starting and Shutting Down the iGUIDE Software on page 41](#)) or after one of the subsystems has been offline.

You can also open the **System Overview** window by clicking the **Subsystems** button.

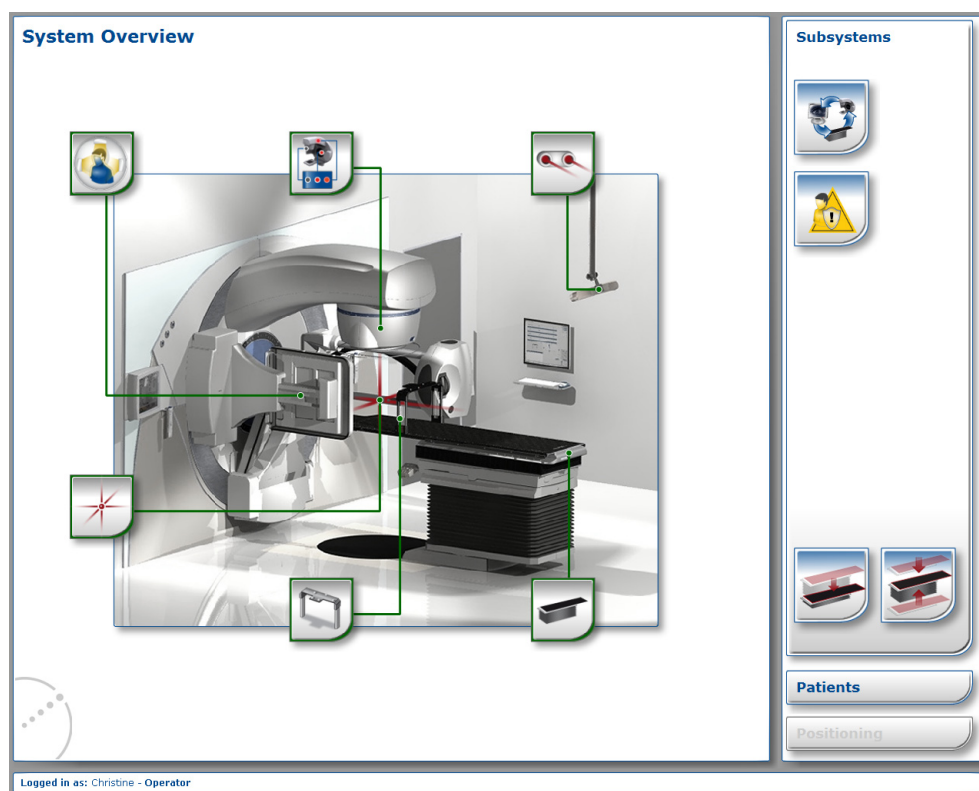


Figure 30 System Overview window

Subsystems control buttons

On the right hand side, there are several control buttons which are explained in the following table.

Table 9 The Subsystems control buttons






Button	Description
 (Connect to all subsystems)	Connects all subsystems.
 (Run checks)	Performs all safety checks one after the other.







Table 9 The Subsystems control buttons

Button	Description
 (Logout)	<p>Logs out of the iGUIDE software.</p> <p>Usually, this button is not visible. It is visible only at the iGUIDE software start for a very short time and in the case of connection problems to substitute the key.</p>
 (Move HexaPOD to LOAD)	<p>Moves the robotic couchtop to its lowest position. Use this position for patients to get on and off the robotic couchtop.</p>
 (Move HexaPOD to START)	<p>Moves the robotic couchtop to its START position. This is the position with optimum movement range. The iGUIDE software will prompt the user to enable the robotic couchtop to move. This should be done prior to patient set up.</p>

Subsystem symbols

On the left hand side, the several subsystem symbols are displayed. They are explained in the following table:

Table 10 Subsystem symbols

Symbol	Description	Refer to...
	<p>Measuring System(s)</p> <p>Displays the status of the external imaging system.</p>	Chap. 7
	<p>Signal Interface</p> <p>Displays the status of the devices on the signal interfaces.</p> <p>The Interlock Check may be started.</p>	Chap. 7 4.3.3
	<p>Camera</p> <p>Displays the camera status.</p> <p>The Correlation Check may be started.</p>	Chap. 7 4.3.2
	<p>Isocenter Manager</p> <p>Displays the isocenter status.</p> <p>The Alignment Check may be started.</p> <p>The system may be calibrated by the administrator.</p>	Chap. 7 4.3.4
	<p>Tools</p> <p>Displays the serial number of the reference frame.</p>	Chap. 7
	<p>HexaPOD</p> <p>Displays the robotic couchtop status.</p> <p>The HexaPOD Enable Check and the Correlation Check may be started.</p>	Chap. 7 4.3.1 4.3.2

4.2 Initialization

When the iGUIDE software starts, it automatically establishes a connection to all subsystems.

The symbol shows the status of the connection:

- Blue (movement in the frame): Subsystem connecting is in progress.
- Green: Subsystem is ready.
- Yellow: Safety checks have not yet been performed for the subsystem.
- Red: Subsystem is not functional. Note, that treatments cannot be performed if any of the symbols are red.

Click a symbol to get more information about the subsystem and a list of appropriate tasks. Example:

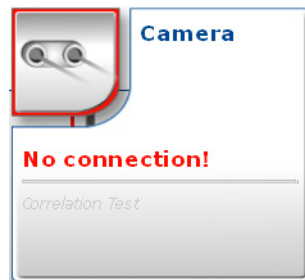


Figure 31 Subsystem without connection

Right-clicking (for iGUIDE administrator only) on a symbol opens a pane with details on the subsystem (refer to [Chapter 7 Managing the iGUIDE Software on page 103](#)).

Note: During the initialization procedure, you may be requested to move the robotic couchtop (refer to [Section 3.3 Performing Movements on page 45](#))

4.3 Performing the Safety Checks

At the beginning of each working day when the iGUIDE software is initially started, the safety checks have to be performed and successfully completed. You can start the safety checks manually as described below.

Note:

Medical Intelligence recommends that you do the Daily QA procedure with the gantry at 180°, in order to clear the area for the camera.



To start the safety checks, click **Run checks**. The checks are performed one after the other and cannot be skipped. These checks can also be run separately between treatments if required.

The following checks must be performed:

- **HexaPOD Enable Check** (see [Section 4.3.1 Performing the HexaPOD Enable Check on page 57.](#))
- **Correlation Check** (see [Section 4.3.2 Performing the Correlation Check on page 57.](#))
- **Interlock Check** (see [Section 4.3.3 Performing the Interlock Check on page 58](#))
- **Alignment Check** (see [Section 4.3.4 Performing the Alignment Check on page 59](#)).

The check results are displayed in the following dialog box:

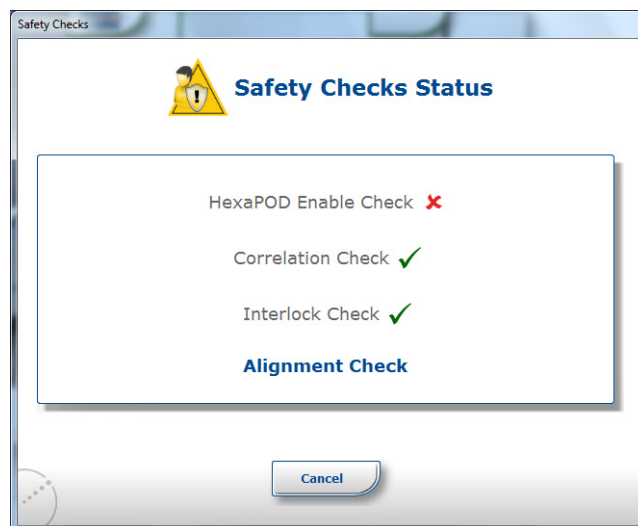


Figure 32 Safety Checks Status dialog

The checks are marked as follows:

- A green tick behind the check means that the check was successfully completed.
- A red x behind a text means that the check had failed.
- A check displayed in blue and bold means that the check is being performed at the moment.
- A check displayed in blue and not bold means that the check is waiting to be started.

When all checks are completed successfully, the **Cancel** button changes to **Close**. Click it to continue working with the iGUIDE software.

If a check fails, the checks that follow are not started automatically. Try and repeat the checks, and if they do not pass, call the system administrator or a service engineer to do a check of the system.

4.3.1 Performing the HexaPOD Enable Check

The **HexaPOD Enable Check** checks if the **OPERATE** buttons on the ESB and the **OPERATE** and **ENABLE** buttons on the HHC are stucked in the **ON** position. If these buttons were stuck any movement requests sent to the robotic couchtop would be carried out immediately (which would pose a safety risk).

The **HexaPOD Enable Check** is started in the check series when you click the **Run checks** button. You can start the **HexaPOD Enable Check** separately by clicking **HexaPOD Enable Check** in the **HexaPOD** status dialog box.

No additional user interaction is required for the **HexaPOD Enable Check**.

Troubleshooting

If the check fails, the **HexaPOD Enable Check** is marked with a red x in the **Safety Check** dialog box. Call the system administrator or a service engineer to do a check of the system.

4.3.2 Performing the Correlation Check

During the **Correlation Check**, the iGUIDE workstation sends movement commands to the robotic couchtop. The camera verifies that the actual movements correlate to the expected movements.

Note:

To avoid collisions and to avoid the gantry obscuring the reference frame, please move the gantry to 180° before starting the Correlation Check.

Before starting the **Correlation Check**, the iGUIDE software requires that the reference frame is mounted in slot A of the table.

The **Correlation Check** is started in the check series when you click the **Run checks** button. You can start the **Correlation Check** separately by clicking **Correlation Check** in the **HexaPOD** status dialog box or in the **Camera** status dialog box.

You have to enable the movements (with the HHC or ESB). For details, see [Section 3.3 Performing Movements on page 45](#).

Troubleshooting

If the check fails, the **Correlation Check** is marked with a red x in the **Safety Check** dialog box. Call the system administrator or a service engineer to do a check of the system.

Note:

The Correlation Check will also fail when the reference frame is not in the slot A.

4.3.3 Performing the Interlock Check

The **Interlock Check** ensures that the HexaPOD evo system can prevent the Linac from radiating when the patient is not in the treatment position. It sets the Linac's **EXTERNAL INHIBIT** signal.

Note: Make sure that the **EXTERNAL INHIBIT** signal is **not** active.

- 1 The **Interlock Check** is started in the check series when you click the **Run checks** button. You can start the **Interlock Check** separately by clicking **Interlock Check** in the **Signal Interface** status dialog box.

Then, follow the instructions on the screen to do the **Interlock Check**.

- 2 The iGUIDE software displays the following dialog box two times:

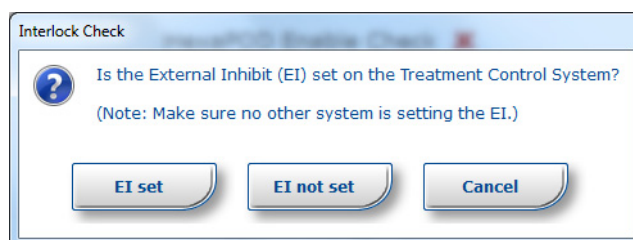


Figure 33 Verify the External Inhibit state

Check the status twice in the **View Restrictions** dialog box at the Linac desktop and click the corresponding button in the **Interlock Check** dialog box each time.

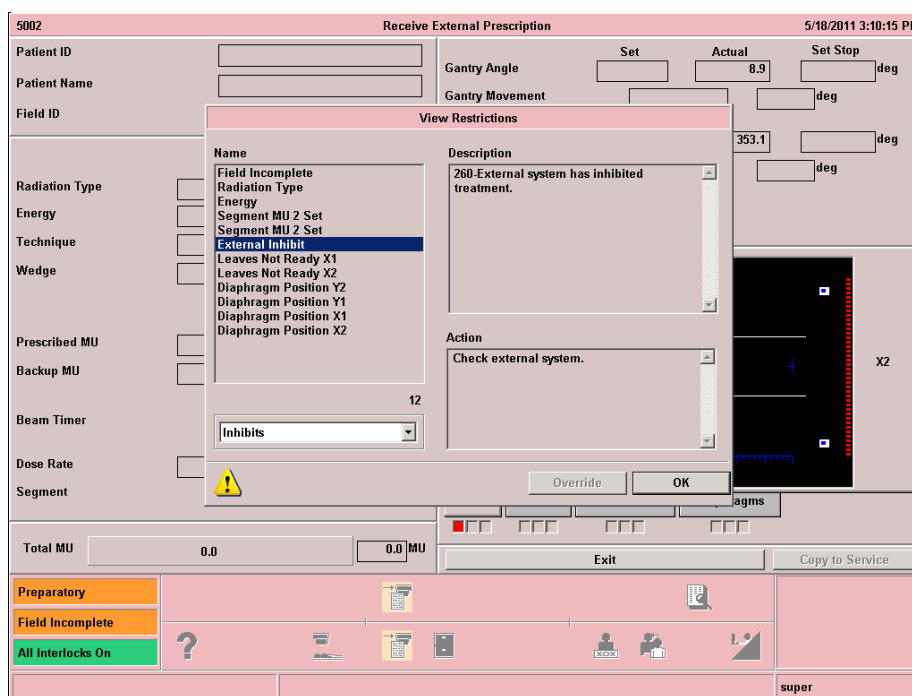


Figure 34 External Inhibit display on the Elekta Desktop software

Troubleshooting

If the check fails, the **Interlock Check** is marked with a red x in the **Safety Check** dialog box. Call the system administrator or a service engineer to do a check of the system.

4.3.4 Performing the Alignment Check

The **Alignment Check** moves the robotic couchtop so that the reference frame is aligned to the room lasers. This verifies that the calibration has not been changed (which occurs, for example, if the camera is moved).

This check requires that

- the treatment room lasers are calibrated,
- the treatment room lasers were not changed since the last iGUIDE software set-to-work procedure and
- the calibration tolerance of the treatment room lasers is $< \pm 0.5$ mm.

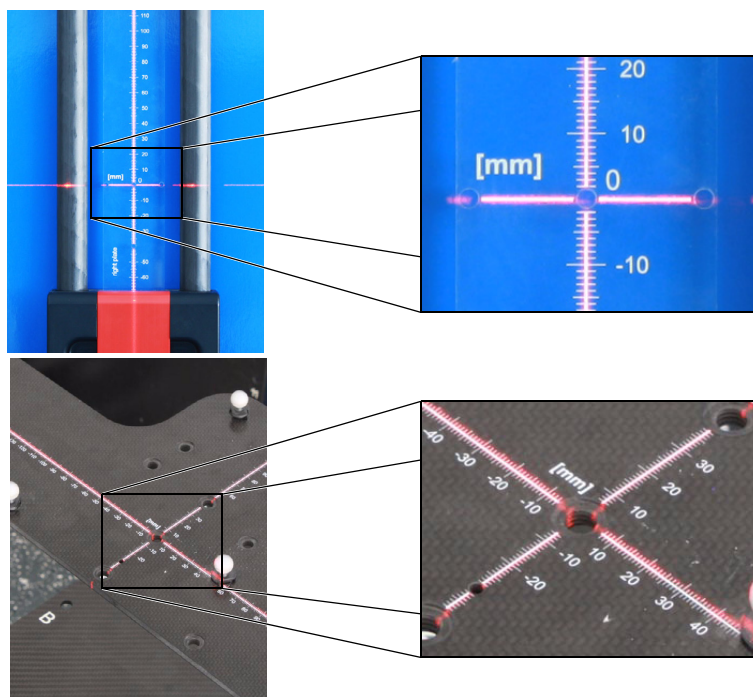


Figure 35 iGUIDE Reference Frame aligned to the room lasers

- 1 The **Alignment Check** is started in the check series when you click the **Run checks** button. You can start the **Alignment Check** separately by clicking **Alignment Check** in the **Isocenter Manager** status dialog box.

Then, follow the instructions on the screen to do the **Alignment Check**.

- 2 The iGUIDE software displays the following dialog.

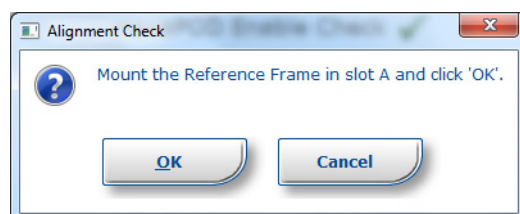


Figure 36 Mount the reference frame for **Alignment Check**

Mount the reference frame in the required slot and click **OK**.

- 3 The iGUIDE software sends movement commands to the robotic couchtop. It may be necessary to first move the Precise Table. You have to enable the movements of the robotic couchtop (using the HHC or ESB).

- 4 When the reference frame has reached the registered location, the iGUIDE software prompts you as to whether the reference frame is aligned with the lasers.

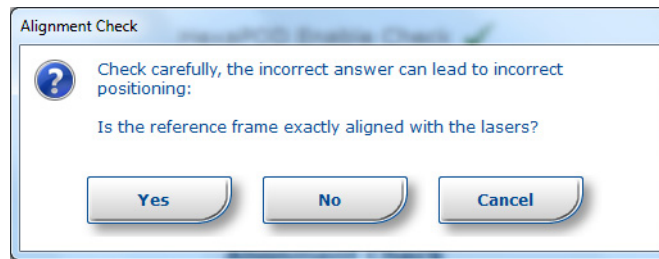


Figure 37 Verifying the alignment of the iGUIDE Reference Frame to the lasers

- 5 Respond to the prompt as follows:
 - Click **Yes** if the reference frame is aligned to the lasers.
 - Click **No** if the reference frame is not aligned to the lasers. Note that it will not be possible to treat patients using the HexaPOD evo system until the **Alignment Check** has been passed.
 - Click **Cancel** to cancel the Alignment Check. Note that the **Alignment Check** must be successfully completed before patients can be treated.



Check the correct alignment of the treatment room lasers with the engravings on the reference frame. If they do not exactly match, inform the administrator. Do not use the HexaPOD evo RT System for treatments.

Troubleshooting

If the check fails, the **Alignment Check** is marked with a red x in the **Safety Checks Status** dialog box. The reason may be for example:

- The room lasers were adjusted.
- The camera was moved.

When the iGUIDE software displays the following dialog, the robotic couchtop may be in **LOAD** position or the camera was moved in a specific direction.

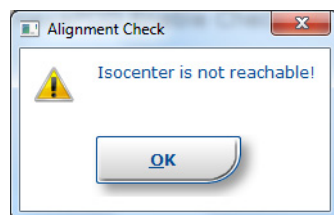


Figure 38 Isocenter not reachable at **Alignment Check**

When the robotic couchtop is in **LOAD** position, move it to **START** position and repeat the **Alignment Check**.

If the robotic couchtop is already in **START** position or if the check still fails, the camera was moved. Then, you have to call the system administrator or a service engineer to move it to its correct position and to perform a system calibration.

5 Managing Patient Data

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5.2	Working on the Patient Record	65
5.3	Managing the Patient Treatment Sites	71

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5.1 The Patients Window

Patient data terms

The iGUIDE software uses three terms for the definition of patient data:

- **Patient**
For every patient a patient record is defined with a unique patient ID. The patient record contains all data of one patient which are relevant for treatment.
- **Treatment site**
A treatment site specifies the area which shall be treated. Several treatment sites may be defined for a patient.
- **Fraction**
A fraction is the whole session in which a specific treatment site of a patient is positioned and irradiated. For a treatment site several fractions may be performed.

Patients window

You manage patient and treatment data from the **Patients** window.

When you have logged in successfully to the iGUIDE software (see [Section 3.2.1 Starting and Shutting Down the iGUIDE Software on page 41](#)) and the daily QA has been performed the **Patients** window is shown automatically.

You can also open the **Patients** window by clicking the **Patients** button.


The screenshot shows the 'Patients' window of the iGUIDE software. On the left, there is a list of patients with columns for patient ID and name. The main area contains a form for a selected patient, showing fields for Patient ID, First Name, Last Name, Date of birth, Sex, and a Comment box. Below this is a 'Relative Table Movement' section with input fields for TX, TY, and TZ coordinates. At the bottom is a 'Fraction Event History' section with two empty boxes. On the right side, there is a 'Subsystems' panel with a 'Patients' sub-panel containing several icons representing different patient management functions. At the very bottom, a status bar indicates the user is logged in as 'Christine - Operator'.











Figure 39 The Patients window

On the left-hand side of the **Patients** window, you see the **Patients** list with columns for the **Name of the patient** and the **Patient ID**.

Patient
management
buttons

The buttons displayed on the right of the patient window are explained in the following table.

Table 11 The patient management buttons

Button	Description	Refer to...
 (Open Fraction for Positioning)	<p>Opens a fraction for patient positioning.</p> <p>A treatment site must be selected.</p> <p>The Positioning window is displayed.</p>	6.2
 (Add Patient)	Adds a patient record.	5.2.2
 (Edit Patient)	Edits a patient record.	5.2.3
 (Delete Archived Patient)	Deletes a patient record from the archive.	5.2.6
 (Add Treatment Site)	Adds a treatment site.	5.3.2
 (Edit Treatment Site)	<p>Edits a treatment site.</p> <p>Only enabled when a treatment site is selected</p>	5.3.3
 (Delete Treatment Site)	<p>Deletes a treatment site.</p> <p>Only enabled when a treatment site is selected</p>	5.3.4
 (Archive patient)	<p>Moves a patient record to the archive.</p> <p>It is recommended that this is done once the treatment cycle of a patient is complete.</p>	5.2.4
 (Open/Close Archive)	Opens the archive and show all archived patient records or to close the archive.	5.2.4
 (Restore Patient)	Restores a patient record from the archive.	5.2.5

5.2 Working on the Patient Record

Always ensure that you have selected the correct patient before editing patient records!

5.2.1 Searching and Selecting a Patient

The **Patients** list on the left side of the **Patients** window displays all currently available patients. Patients that have been moved to the archive will not be displayed.

User action

To search for a patient, you may enter a name, a patient ID, or parts of a name or patient ID in the input field of the **Patients** list. The input is used as a filter and the corresponding entries are listed in the **Patients** list.

To select a patient, click the patient name in the **Patients** list. The iGUIDE software displays the personal and treatment data of the patient on the right side:

The screenshot shows the iGUIDE software interface. On the left, the **Patients** list displays a search bar with 'Mi' entered and a list of patients, with 'Miller Susan' (ID 05432) selected. The main area displays patient details for Susan Miller (ID 05432), including fields for Patient ID, First Name, Last Name, Date of birth, Sex, and a Comment field. Below this is the **Treatment Site Overview** table.

Treatment Site	Last Opened	# Fractions
description...	1/25/2011	0

On the right side, there is a **Subsystems** panel with a **Patients** section containing icons for various patient-related actions. At the bottom, a status bar indicates 'Logged in as: Christine - Operator'.

Figure 40 How to select a patient

The following patient data is displayed:

- unique patient ID (e.g. 05432),
- first name (e.g. Susan),
- last name (e.g. Miller),
- date of birth (e.g. 01/01/1990),
- sex (e.g. Female),
- comment (e.g. treatment description)
- treatment site overview (consisting of treatment site, date and number of fractions for each treatment site)

5.2.2 Adding a New Patient



- 1 Click the **Add Patient** button.

The **Add Patient** dialog box is opened where you can enter the patient data.

- 2 Fill in the relevant patient data on the corresponding fields and check boxes:

- **Patient ID** - type it in (e.g. **05432**)
The patient ID must be unique. If you type in a patient ID that already exists, the iGUIDE software will not create a new patient record (data typed in the other fields will be lost).
- **First Name** - type it in (e.g. **Susan**)
- **Last Name** - type it in (e.g. **Miller**)
- **Date of birth** - modify the displayed date (e.g. **01.01.1980**).
Enter the new value manually or click on the arrows on the right side to decrement or increment the value displayed.
- **Sex** - click the corresponding check-box (e.g. **Female**)
- **Comment** - type in a comment if needed. (e.g. treatment description).
It is not mandatory to enter a comment.

All fields are required except the **Comment** field.

Figure 41 **Add Patient** dialog box

- 3 Click **Save**.

The iGUIDE software creates a new patient record. The patient data is displayed in the **Patients** window.

The screenshot shows the 'Patients' window in the iGUIDE software. On the left, a list of patients is displayed, with 'Miller Susan' selected. The main area shows the patient's details: Patient ID (05432), First Name (Miller), Last Name (Susan), Date of birth (1/1/1990), and Sex (Female). There is a 'notes...' field and a 'Comment' field. Below this is a 'Treatment Site Overview' table:

Treatment Site	Last Opened	# Fractions
Pelvis	1/25/2011	0

On the right side, there is a 'Subsystems' panel with a 'Patients' section containing icons for various patient management tasks. At the bottom, it says 'Logged in as: Christine - Operator'.

Figure 42 New patient

The **Add Treatment Site** dialog box is opened.

- 4 If desired you can enter the RTM values for the new patient (for a description of RTMs, refer to [Section 2.5 How the HexaPOD evo RT System Positions Patients on page 34](#)).

The screenshot shows the 'Add Treatment Site' dialog box. It has a title bar 'Add Treatment Site' and a close button. Inside, there is a 'Treatment Site' text field with a placeholder 'description...'. Below this is a section titled 'Relative Table Movement' with three input fields: 'TX: 1 cm', 'TY: 2 cm', and 'TZ: 3 cm'. The text 'IEC61217 Coordinate System' is displayed below these fields. At the bottom, there are 'Save' and 'Cancel' buttons.

Figure 43 Add Treatment Site dialog box



Always verify that you have entered the RTM values correctly and that the correct coordinate system is selected.

- 5 If you want to add the treatment site later, click **Cancel**. As a result of this, the patient data will contain no treatment site.

Note: If RTM is not necessary, enter zero in the three RTM fields.

5.2.3

Editing a Patient Record

- 1 In the **Patients** list, select the patient record you want to edit.
- 2 Click the **Edit Patient** button.

The **Edit Patient** dialog box is opened. Here you can modify the patient data.



Edit Patient

Patient ID: 05432

First Name: Miller

Last Name: Susan

Date of birth: 1/1/1990

Sex: ☐ Male ☒ Female

notes...

Comment

Save Cancel

Figure 44 **Edit Patient** dialog box

- 3 Edit the data as required and then click **Save**.
The **Edit Patient** dialog is closed and the iGUIDE software displays the modified data.

5.2.4 Archiving a Patient Record

Once the course of treatment for a patient is complete, you can move the patient record to the archive. The patient records in the archive remain within the database, but the iGUIDE software does not display them on the **Patients** list.

You can restore patient records from the archive. Restored patient records will be displayed again on the **Patients** list (refer to [Section 5.2.5 Restoring an Archived Patient Record on page 69](#)).

- 1 In the **Patients** list, select the patient record you want to archive.
- 2 Click the **Archive patient** button.
- 3 The iGUIDE software prompts you for confirmation.

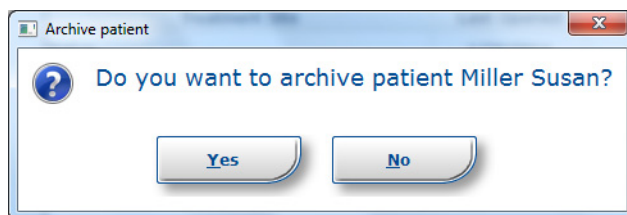


Figure 45 Archive confirmation dialog

Click **Yes** to archive the patient record. The patient data is moved to the archive and is no longer available in the **Patients** list.

5.2.5 Restoring an Archived Patient Record

To restore a patient from the archive you have to display the archived patients list first.

- 1 In the **Patients** window, click the **Open/Close Archive** button.

The iGUIDE software displays all patients contained in the archive.

The frame around the **Open/Close Archive** button becomes green. The **Delete patient** button and the **Restore Patient** button become accessible.

- 2 In the **Archived Patients** list, select the patient record you want to restore.
- 3 Click the **Restore Patient** button.

The patient record is restored and no longer displayed in the **Archived Patients** list. Click the **Open/Close Archive** button to show the **Patients** list with the active patient records.



5.2.6 Deleting an Archived Patient Record

Deleting a patient record means that it will be removed permanently from the database and that it cannot be restored. You can only delete patient records that have been archived. This can only be done from the archive list.



- 1 In the **Patients** window, click the **Open/Close Archive** button.

The iGUIDE software displays all patients contained in the archive.

The frame around the **Open/Close Archive** button becomes green. The **Delete patient** button and the **Restore Patient** button become accessible.

- 2 In the **Archived Patients** list, select the patient record you want to delete.

- 3 Click the **Delete Archived Patient** button.

The iGUIDE software prompts you for confirmation.

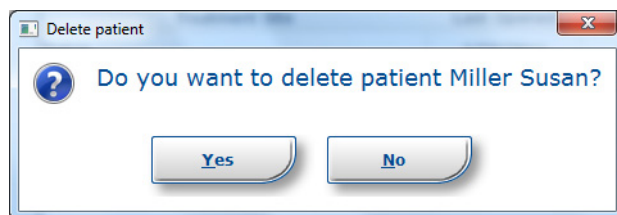


Figure 46 Delete confirmation dialog

- 4 Click **Yes** to delete the patient record. The iGUIDE software removes the patient from the database.

5.3 Managing the Patient Treatment Sites

This section describes how to manage the treatment sites of a patient and how to display the fraction event history of a treatment site.

- 1 Select a patient in the **Patients** list, see [Section 5.2.1 Searching and Selecting a Patient on page 65](#).

The treatment site names for the selected patient are displayed below the patient and a **Treatment Site Overview** table is displayed on the right side:

The screenshot shows the 'Patients' window in a software interface. On the left, there is a list of patients with columns for patient name and ID. 'Test Patient 4' is selected. Below this list, a tree view shows treatment sites: '000', '10Z', and 'smallRTM'. The main area displays patient details for 'Test Patient 4' (ID: 12345678904, First Name: Test, Last Name: Patient 4, Date of birth: 9/4/1991, Sex: Male). A comment field is also present. Below the details, the 'Treatment Site Overview' table is displayed.

Treatment Site	Last Opened	# Fractions
000	12/22/2010	20
10Z	1/25/2011	2
smallRTM	1/25/2011	5

On the right side of the window, there is a 'Subsystems' panel with a 'Patients' section containing icons for patient management. At the bottom, a status bar indicates 'Logged in as: Christine - Operator'.

Figure 47 The Patients window with Treatment Site Overview

5.3.1 Displaying Information on a Treatment Site

- 1 Select the treatment site you want to manage in the **Patients** list.

The **Fraction Event History** with the list of treatment site fractions is displayed:

Patients

Patient	ID
Test Patient 1	12345678901
Test Patient 2	12345678902
Test Patient 3	12345678903
Test Patient 4	12345678904
Miller Susan	05432

Patient ID 05432

First Name Miller

Last Name Susan

Date of birth 1/1/1990 **Sex** Female

Comment notes...

Relative Table Movement

TX: 1.00 cm TY: 2.00 cm TZ: 3.00 cm
IEC61217 Coordinate System

Fraction Event History

1	1/25/2011 7:10 PM
2	1/25/2011 7:12 PM

Logged in as: Christine - Operator

Figure 48 The **Patients** window with selected treatment site

- 2 If you want to get more information about a fraction, click on the corresponding entry in the **Fraction Event History** box.

The iGUIDE software displays the event history of the selected fraction:

The screenshot displays the iGUIDE software interface. On the left, a 'Patients' list shows four test patients and one named patient, Miller Susan, with ID 05432. The main area shows patient details for Miller Susan, including ID, name, date of birth, sex, and a comment field. Below this is the 'Relative Table Movement' section with TX, TY, and TZ coordinates. The 'Fraction Event History' section shows a list of events for two dates: 1/1/2011 and 1/25/2011. The events include fraction opening, patient registration, RTM starting, imaging completion, PEC starting, target reaching, high tension signal changes, and treatment fraction closing. A 'Details' button is visible at the bottom right of the event history list. On the right side, there is a 'Subsystems' panel with various icons for patient management and treatment. The bottom status bar indicates the user is logged in as 'Christine - Operator'.

Patients

Patient ID	First Name	Last Name	Date of birth	Sex
05432	Miller	Susan	1/1/1990	Female

Relative Table Movement

TX: 1.00 cm TY: 2.00 cm TZ: 3.00 cm
IEC61217 Coordinate System

Fraction Event History

Date/Time	Event
1/1/2011 7:10 PM	7:10 PM Fraction opened
1/25/2011 7:12 PM	7:11 PM Patient position registered
	7:11 PM Started RTM (1, 2, 3)
	7:12 PM Target reached (RTM)
	7:12 PM Received imaging permission request: acc
	7:12 PM Imaging complete
	7:12 PM Started PEC (0.00, 0.00, 1.00, 0.0, 0.0,
	7:12 PM Target reached (PEC)
	7:12 PM High Tension signal changed to (On)
	7:12 PM High Tension signal changed to (Off)
	7:12 PM Treatment fraction closed

Logged in as: Christine - Operator

Figure 49 The Fraction Event History

- If you want to get detailed information about a fraction, click on **Details** underneath the **Fraction Event History** box.

Note: The detailed information is needed only for analysis or diagnostic.

The iGUIDE software displays the detailed history of the selected fraction as properties tree. For single information on one property you can click the corresponding arrow.

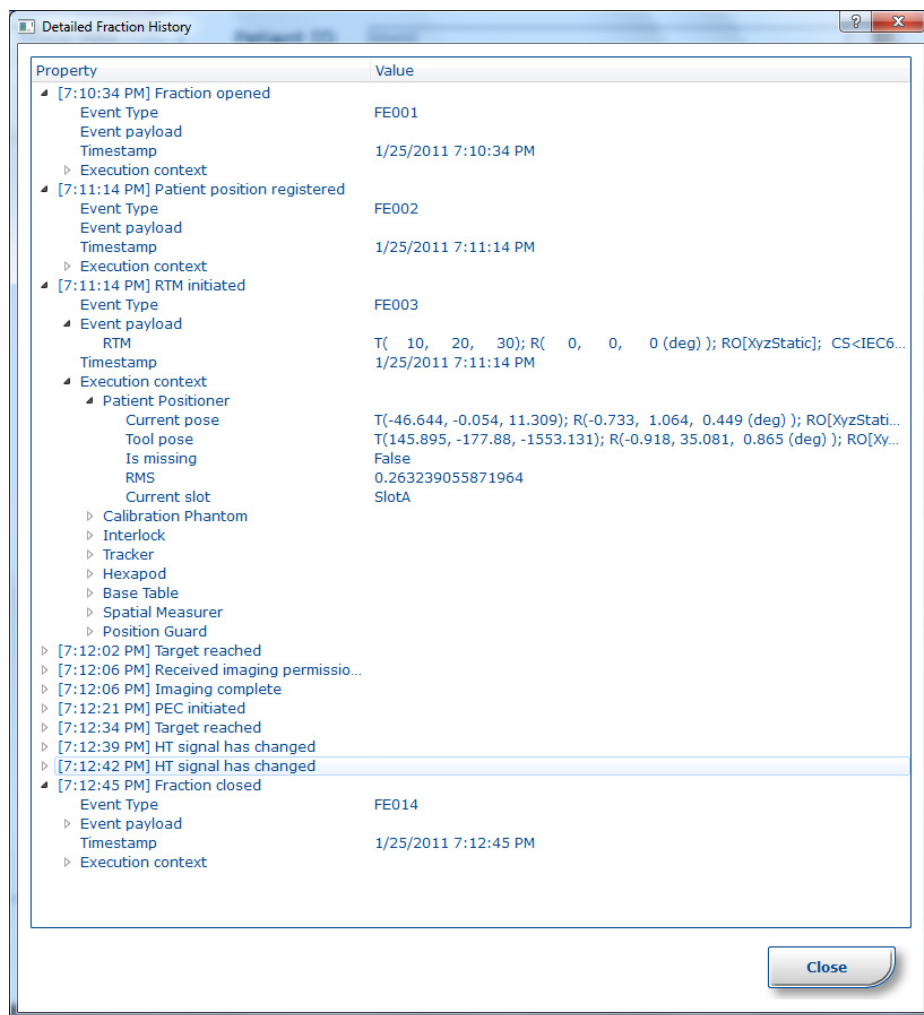


Figure 50 The detailed fraction history

5.3.2

Adding a Treatment Site



- 1 Click the **Add Treatment Site** button.
The **Add Treatment Site** dialog box is opened where you can enter the treatment site values.
- 2 Define the name of the treatment site and the RTM values if desired (refer to [Section 2.5 How the HexaPOD evo RT System Positions Patients on page 34](#)):

Figure 51 Add a treatment site



Always verify that you have entered the RTM values correctly and that the correct coordinate system is selected.

Note: The coordinate system which is used for RTM is shown under the **Relative Table Movement** values (in the example above it is **IEC61217 Coordinate System**). This will be displayed if selected. For additional information, refer to [Section 2.4 Coordinate Systems Used by the iGUIDE Software on page 32](#).

Note: When you use other systems that also support relative patient positioning, then Medical Intelligence strongly recommends **not to use** the RTM feature of the iGUIDE software patient management. See [Section 2.5 How the HexaPOD evo RT System Positions Patients on page 34](#) for details.

3 Click **Save**.

The iGUIDE software displays the newly created treatment site in the **Treatment Site Overview**:

Patients

Patient ID	First Name	Last Name	Date of birth	Sex
05432	Miller	Susan	1/1/1990	Female

Comment

Relative Table Movement

TX: 0.00 cm TY: 0.00 cm TZ: 0.00 cm
IEC61217 Coordinate System

Fraction Event History

Logged in as: Christine - Operator

Figure 52 The newly created treatment site in the **Treatment Site Overview**

5.3.3

Editing a Treatment Site

- 1 Select the treatment site that you intend to edit in the **Patients** list.
- 2 Click the **Edit Treatment Site** button.

The **Edit Treatment Site** dialog box is opened.

- 3 Edit the necessary information:



Edit Treatment Site

Treatment Site: newRTM

Relative Table Movement

TX: 1 cm TY: 2 cm TZ: 4 cm
IEC61217 Coordinate System

Save Cancel

Figure 53 Click on a field in order to allow the modification of its content

- 4 Once you have finished all modifications, click **Save**.
The modified values are displayed in the **Patients** window.

The screenshot shows the 'Patients' window in the iGUIDE software. On the left, a list of patients is displayed with columns for patient name and ID. The patient 'Miller Susan' with ID '05432' is selected. The main area shows the details for this patient, including fields for Patient ID, First Name, Last Name, Date of birth, Sex, and a Comment field. Below these fields, the 'Relative Table Movement' section shows TX: 1.00 cm, TY: 2.00 cm, and TZ: 4.00 cm, with the coordinate system 'IEC61217 Coordinate System' selected. The 'Fraction Event History' section is empty. On the right, a 'Subsystems' panel shows a list of subsystems with icons, including 'Patients', 'Positioning', and others. The bottom status bar indicates 'Logged in as: Christine - Operator'.

Figure 54 The newly defined RTM values

Note: The used coordinate system is shown under the **Relative Table Movement** values (in the example above it is **IEC61217 Coordinate System**). This will be displayed if selected. For additional information, refer to [Section 2.4 Coordinate Systems Used by the iGUIDE Software on page 32](#).

5.3.4 Deleting a Treatment Site

- 1 Select the treatment site that you intend to remove permanently from the database in the **Patients** list.

The treatment site management buttons that are available are displayed on the right side.



- 2 Click the **Delete Treatment Site** button.

The iGUIDE software prompts you for confirmation.

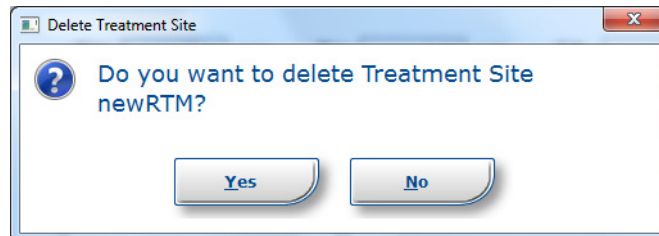


Figure 55 **Delete Treatment Site** confirmation dialog

- 3 Click **Yes** to delete the treatment site. The iGUIDE software removes the treatment site from the database.

Note:

*With **Delete Treatment Site** the **Fraction Event History** will also be deleted.*

6 Positioning the Patient

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6.2	Starting the Patient Positioning	84
6.3	Registering the Patient.....	85
6.4	Performing the Relative Table Movements (RTMs)	86
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6.1

The Positioning Window

From the **Positioning** window you can move and control the robotic couptop allowing you to position it in the isocenter for radiation treatment.

To open the window click **Open Fraction for Positioning** on the right side of the **Patients** window after you have selected a treatment site (refer to [Section 5.3 Managing the Patient Treatment Sites](#) on page 71).



Positioning: Miller Susan, 05432

Assumed RF slot: ☐ A ☐ B ☒ C ☐ D ☐ E ☐ F ☐ G

Treatment Site: noRTM

Relative Table Movement			Positional Error			
	Translation [cm]		Translation [cm]		Rotation [deg]	
	Set Value	Actual Value	Set Value	Actual Value	Set Value	Actual Value
X	0.00	0.00	X	0.00	0.00	0.00
Y	0.00	0.00	Y	0.00	0.00	0.00
Z	0.00	0.00	Z	0.00	0.00	0.00

IEC61217 Coordinate System Synergy Coordinate System

Logged in as: Christine - Operator

Subsystems

Patients

Positioning





Figure 56 Positioning window

System symbols and positioning data

On the left hand side of the **Positioning** window, you see a treatment room illustration and the positioning data of the selected patient.

At the left side of the treatment room illustration several symbols may appear, their meanings are described below.

Table 12 The system symbols

Symbol	Description	Refer to...
	Status of the Position Guard.	Table 13
	EXTERNAL INHIBIT signal is set (no radiation possible).	1.7.2
	The Linac is sending a blocking signal. Possible reasons: Touchguard or the terminate key may have been activated.	6.8
	Indicates that the reference frame cannot be tracked (out of volume).	6.8




At the bottom of the figure, the slot used for the reference frame is shown (also refer to section [Verifying the reference frame slot on page 85](#)).

Below the figure two tables display the values for the **Relative Table Movement** and the **Positional Error** correction.

Position Guard indicator

Depending on the status of the Position Guard (refer to [Section 1.7.2 Safety Features on page 21](#)), it may have the following colors:








Table 13 The Position Guard indicator

Symbol	Description
	The Position Guard is active. The position of the robotic couchtop is within the tolerance limits of the iGUIDE software.
	The Position Guard is inactive (during treatment, imaging or movements requested by iGUIDE).
	The position of the robotic couchtop is out of tolerance. The iGUIDE software raises the EXTERNAL INHIBIT signal (refer to Section 1.7.2 Safety Features on page 21).

Positioning buttons and status symbols

On the right side of the screen, there are several buttons/status symbols which are explained in the following table. The buttons represent the steps involved in the iGUIDE software workflow. Once they have been completed by the users a green tick appears over the button. Each step must be completed before the next button/step can be selected/started.

Table 14 The positioning buttons and status symbols

Button/Status symbol	Description	Refer to...
 (Restart Positioning)	Goes back to the beginning of the positioning procedure.	
 (Register Patient)	Registers a patient. Click this button once the relevant patient marking have been aligned to treatment room lasers.	6.3
 (Relative Table Movement)	Displays the status of the Relative Table Movements.	6.4
 (Imaging completed)	If enabled, it indicates that the iGUIDE software is ready to receive the PE data from the external measurer. Click to enter the PE values manually.	6.5
 (Positional Error Correction)	Displays the status of the Positional Error Correction.	6.5
 (Edit PE values)	Edits the PE values entered manually. Only enabled when you have manually entered the PE values.	6.5.2
 (Abort Fraction) or (Close Fraction)	Aborts the fraction before treatment has been started or close the fraction after treatment.	6.9

6.2 Starting the Patient Positioning

The first steps to start with the patient positioning are

- setting up and immobilize the patient correctly
- mounting the reference frame

Assisting patients onto the robotic couchtop

It is recommended that you move the robotic couchtop to the **LOAD** position (lowest position) when helping patients onto or off the robotic couchtop (also refer to [Section 3.3.2 Enabling HexaPOD evo RT Couchtop Movements on page 46](#)).

- 1 Hold the **ENABLE** buttons on the HHC and press the **LOAD** button on the control panel.

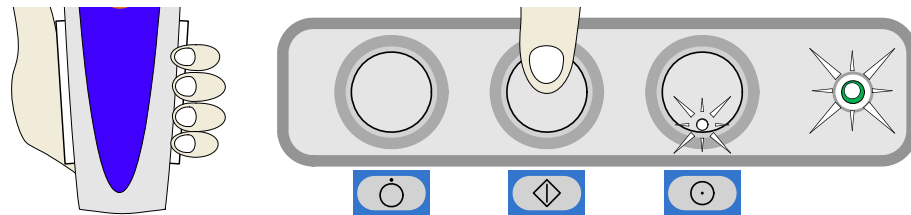


Figure 57 Moving the HexaPOD evo RT Couchtop to the **LOAD** position

- 2 Press the **OPERATE** and **ENABLE** buttons on the HHC to enable the movement.

The robotic couchtop then moves to the lowest position. You can now assist the patient onto or off the robotic couchtop.



WARNING

The HexaPOD evo RT System positions and monitors the robotic couchtop, not the patient directly. The patient must be adequately immobilized and the user must watch the patient at all times during positioning and treatment.

Note:

Confirming settings on XVI before the iGUIDE software is ready to begin imaging will break the iGuide workflow. As a result of this, the gantry needs to be manually moved to the acquisition start angle.

Opening an new fraction

To position a patient for treatment, you have to select the patient and the treatment site (for details, refer to [Chapter 5 Managing Patient Data on page 61](#)) and then open a new fraction.



- 1 To do this, click **Open Fraction for Positioning** on the right side of the **Patients** window.

The **Positioning** window is opened and the iGUIDE software generates a new data set for the treatment fraction. You can view this data set later in the Fraction history, see [Section 5.3.1 Displaying Information on a Treatment Site on page 72](#). In this data set, the iGUIDE software saves all relevant actions during the fraction.



WARNING

Ensure that the correct patient is selected in the iGUIDE software. You can do this for example by asking for name and date of birth.

Note: When you open a new fraction, the HexaPOD system automatically raises the **EXTERNAL INHIBIT** signal (refer to [Section 6.1 The Positioning Window on page 81](#)).

Moving the robotic couchtop to its START position

When opening a fraction, the iGUIDE software prompts you automatically to move the robotic couchtop into its **START** position. This movement should only be enabled once the patient is safely on the robotic couchtop. The **START** position allows the robotic couchtop the maximum range of movement possible for PE corrections. You must ensure that the robotic couchtop has reached this position before using the Precise table to align to the patients external surface markings (e.g. tattoos, marks on shells or to cover sheets) to the treatment rooms lasers.

Verifying the reference frame slot

Once the patient is aligned to the room lasers, you can mount the reference frame. After you have mounted the reference frame you must check that the assumed position, as displayed in the **Positioning** window, corresponds to the actual position.



Figure 58 Assumed slot for reference frame indication

If the reference frame is mounted in another slot, click the corresponding radio button. The new selection is shown as follows:



Figure 59 Selected slot for reference frame indication

Note: After you register the patient, you can no longer change the slot for the current fraction.

Note: The iGUIDE software stores the slot selection for the next fraction.

6.3 Registering the Patient

Before you register a patient, make sure that the patients external marks (e.g. tattoos) for the selected treatment site have been aligned with the lasers.

To confirm that the patient has been aligned to the lasers, click **Register Patient**.



WARNING

Do not move the reference frame to another slot after the patient has been registered.

Note:

If any movements of the robotic couchtop or the Linac Precise Table are required at this stage, you will see the corresponding requests or movement hints (refer to [Section 3.3 Performing Movements on page 45](#)).

6.4 Performing the Relative Table Movements (RTMs)

If RTM values have been defined for the treatment site (see [Section 2.5 How the HexaPOD evo RT System Positions Patients on page 34](#) for details), the robotic couchtop will now have to perform the movements. You will have to enable them using the HHC or ESB.

The iGUIDE software shows the defined RTMs and the current position of the robotic couchtop in relation to the registered position.

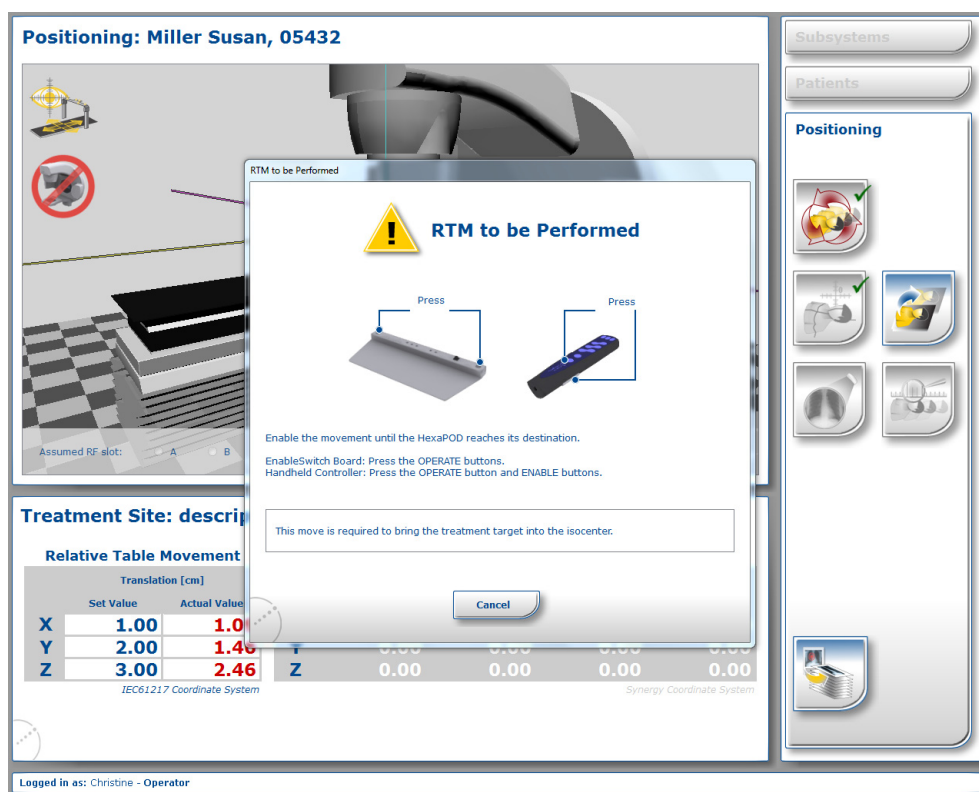


Figure 60 Performing RTMs

- In the **Set Value** column, the iGUIDE software displays the RTM values from the patient record.
- In the **Actual Value** column, the system displays the current position of the robotic couchtop in relation to the position where you registered the patient.

For further details and directions, refer to [What are RTMs? on page 34](#).



WARNING

Make sure that RTMs are only performed once, guided either by the HexaPOD evo system or by another system such as the Desktop or Mosaiq.

When the RTM is zero or if it is successfully performed, the RTM to be performed dialog box is closed, the new values are displayed green and the **Relative Table Movement** button is indicated with a green tick.

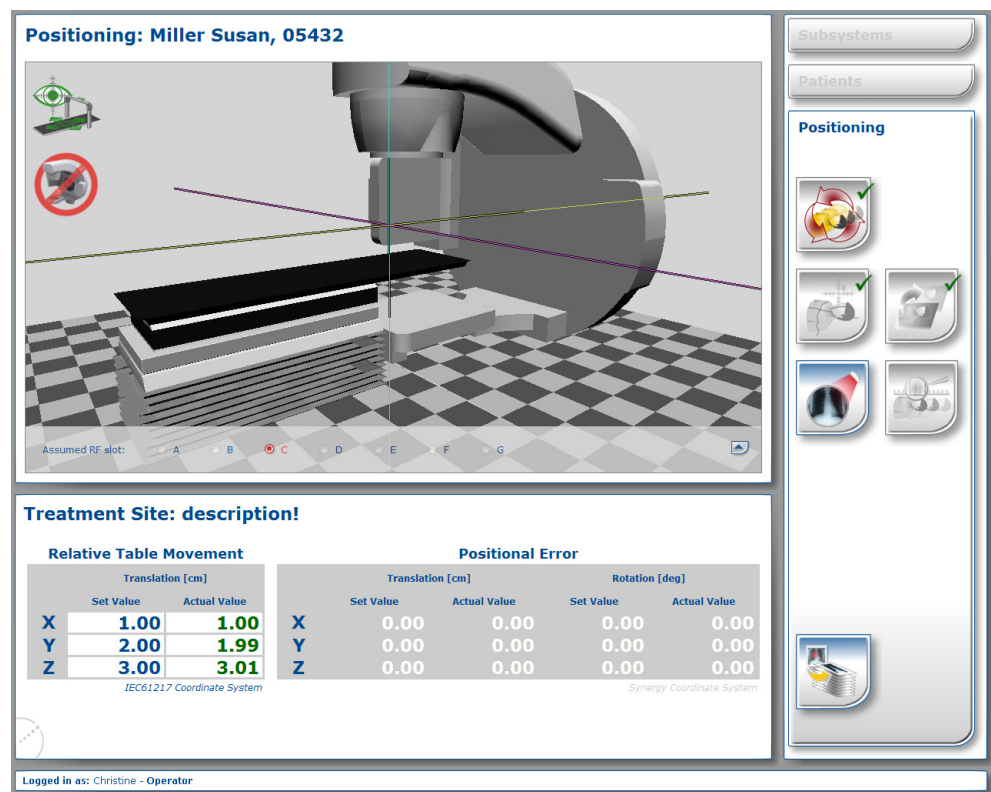


Figure 61 RTM successfully performed

6.5 Correcting the Positional Error

Overview

Once the RTMs are complete, the further general workflow for Linacs that are equipped with an XVI system is, that

- you acquire a volumetric kV-image of the patient
- the XVI system reconstructs the volumetric image and registers it against the planning CT data set of the patient
- the XVI system calculates a set of PE values
- the XVI system transfers the PE values to the iGUIDE software when automatic Positional Error transfer is available
- the iGUIDE software transforms the PE values into correction values and sends the movement commands to the robotic couchtop
- you enable the movements to bring the patient into the final treatment position

Note: For detailed information on XVI, please refer to the XVI user documentation.

Positional Error table

The **Positional Error** table provides two sets of six display fields each.

- On the left the values for the translation can be seen.
- On the right the values for the rotation can be seen.

Positional Error				
	Translation [cm]		Rotation [deg]	
	Set Value	Actual Value	Set Value	Actual Value
X	0.00	0.00	0.00	0.00
Y	0.00	0.00	0.00	0.00
Z	0.00	0.00	0.00	0.00
Synergy Coordinate System				

Figure 62 The **Positional Error** table

The **Set Value** columns show the values calculated by the XVI system. The **Actual Value** columns show the current position of the robotic couchtop.

The colors of the values indicate the position status of the related axis, see following table.

Table 15 Indication of the PE value colors

Value color	Meaning
White	The kV-imaging is not yet complete and PE data not available or transferred.
Red	The position of the robotic couchtop is out of tolerance, treatments are not possible.
Yellow	The position of the robotic couchtop has been changed but the user has confirmed that the patient is in the correct position for treatment. The patient can be treated.
Green	The position of the robotic couchtop is within tolerance, the patient can be treated.

To correct the PE, you have two possibilities:

- automatic transfer (refer to [Section 6.5.1 Automatic Positional Error Transfer from XVI on page 89](#))
- manual correction (refer to [Section 6.5.2 Manual Positional Error Transfer on page 92](#)).

6.5.1 Automatic Positional Error Transfer from XVI

To correct the PE using automatic transfer from XVI to the iGUIDE software (available in XVI R4.5 and higher):

- 1 Before scanning the patient ensure that the correction method chosen at XVI is **HexaPOD**.



Never enable movements of the robotic couchtop while imaging is in progress.



- 2 When the iGUIDE software is ready to receive the PE data from XVI, the **Imaging completed** button is enabled in the **Positioning** window.
- 3 When the settings are confirmed at XVI, the scan may be started by the user. XVI sends a message to the iGUIDE software notifying that the scan is starting. This message includes the patient ID.

The following message will appear on the iGUIDE software:

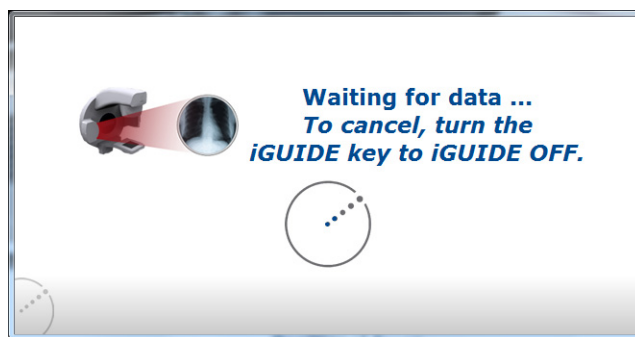


Figure 63 Waiting for Positional Error data from XVI

If this message does not appear, you will have to transfer the PE correction values manually from the XVI software to the iGUIDE software. See [Enabling manual Positional Error transfer](#) below.

Note:

*If the user clicks **Dismiss** at XVI, the iGUIDE software will remain in this state. Abort the fraction by turning the iGUIDE key (see [Turn the iGUIDE key](#) below).*

- 4 When the scan has been reconstructed and the image registration has been performed, the XVI system sends the PE correction values to the iGUIDE software. The **Waiting for Data** message will close and the **Positional Error** dialog box will appear with the received data.

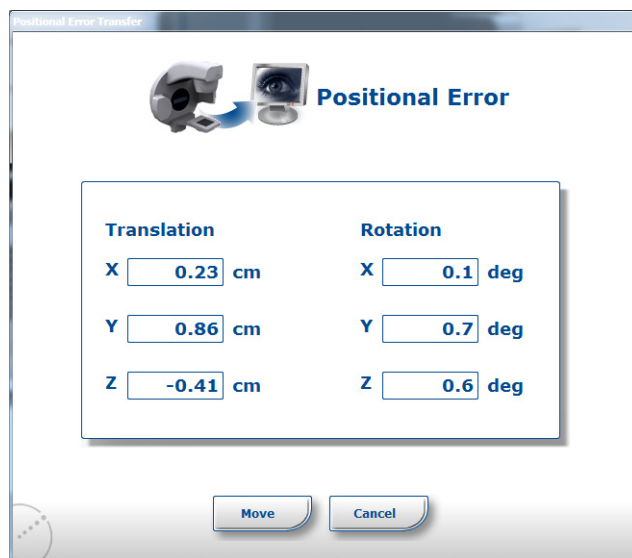


Figure 64 Positional Error values transferred

If the **Positional Error** dialog box does not appear, abort the fraction by turning the iGUIDE key (see [Turn the iGUIDE key](#) below).

- 5 Confirm the PE correction by clicking the **Move** button.

If the movement is too large for the robotic couchtop to complete, the iGUIDE software will prompt you to move the Precise table (refer to [Section 3.3 Performing Movements on page 45](#)). Once this has been done or if this is not needed the robotic couchtop movement can be enabled and the values are displayed in green in the **Positioning** window.

Once the robotic couchtop reaches its intended final position, the iGUIDE software releases the **EXTERNAL INHIBIT** signal.

- 6 Now, the robotic couchtop is at its final position for treatment. Before starting treatment, you may continue with [Section 6.6 Verifying the Patient Position on page 95](#). The Position Guard constantly monitors the position of the robotic couchtop, see [Section 6.8 Handling the Position Guard Alert on page 98](#).

Troubleshooting

Enabling manual Positional Error transfer



In case of problems (see step 3 above) you may have to transfer the PE corrections from the XVI system to the iGUIDE software manually.

You enable the manual PE transfer by clicking the **Imaging completed** symbol. The iGUIDE software will prompt for your confirmation:

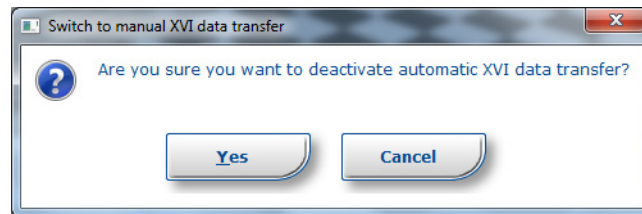


Figure 65 Switch to manual mode

For additional information, refer to [Section 6.5.2 Manual Positional Error Transfer on page 92](#).

Turn the iGUIDE key

The **Imaging in progress** message will close when the PE correction data has been successfully transferred. If it remains opened when the XVI scan is finished, turn the **iGUIDE** key to **iGUIDE OFF**. The fraction will be closed and the iGUIDE software displays the following dialog:

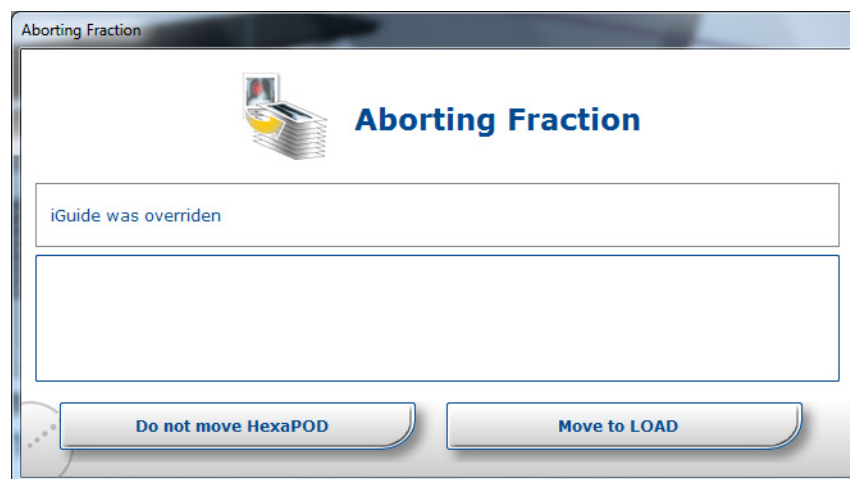


Figure 66 The Aborting Fraction dialog

Before you click the desired option, you have two possibilities to turn the **iGUIDE** key:

- If you turn the **iGUIDE** key back to the **iGUIDE ON** position before clicking an option, the **Patients** window will be opened.
- If you leave the **iGUIDE** key at the **iGUIDE OFF** position before clicking an option, the login window will be opened.

Now, enter a comment and click the desired option in the **Aborting Fraction** dialog.

6.5.2 Manual Positional Error Transfer

You may correct the Positional Error manually if you have a version before XVI R4.5, if your system is configured for manual PE correction or if problems occur at the automatic transfer from XVI (see [Section 6.5.1 Automatic Positional Error Transfer from XVI on page 89](#)).

If the automatic transfer from XVI fails, then please refer to [Enabling manual Positional Error transfer on page 91](#) and then continue with step 3 below. Else, do all steps listed below.



WARNING

Ensure that the position of the patient does not change between the XVI scan and entering of the PE values from the XVI system.



- 1 Follow the XVI instructions to get the PE values.
- 2 In the **Positioning** window of the iGUIDE software click **Imaging completed**.
- 3 The **Positional Error** dialog box is displayed.

Step through **all six** entry fields for the correctional position values and enter the values as displayed on the XVI screen.

For safety reasons, you have to enter the values twice:

Figure 67 Manual Positional Error Transfer

The iGUIDE software will not allow you to enter rotations above ± 2.9 . If rotations of this magnitude occur, the user should check the patient position.

Note: *Multiple, significant rotation correction values can be an indication that the patient was not set up correctly.*

- 4 Confirm the PE correction by clicking the **Move** button.

Note: The **Edit PE values** button is activated when you click the **Move** button. You can use **Edit PE values** button to modify the PE values. See below for details.

- 5 If necessary, move the Precise Table as shown in the movement hints (refer to [Section 3.3.1 Moving the Linac Precise Table on page 45](#)).
- 6 Enable the movement of the robotic couchtop by pressing the **ENABLE** buttons on the ESB (refer to [Section 3.3.2 Enabling HexaPOD evo RT Couchtop Movements on page 46](#)).

The robotic couchtop will now move to the final treatment position.

- 7 Before starting treatment, continue with [Section 6.6 Verifying the Patient Position on page 95](#). The Position Guard constantly monitors the position of the robotic couchtop, see [Section 6.8 Handling the Position Guard Alert on page 98](#).

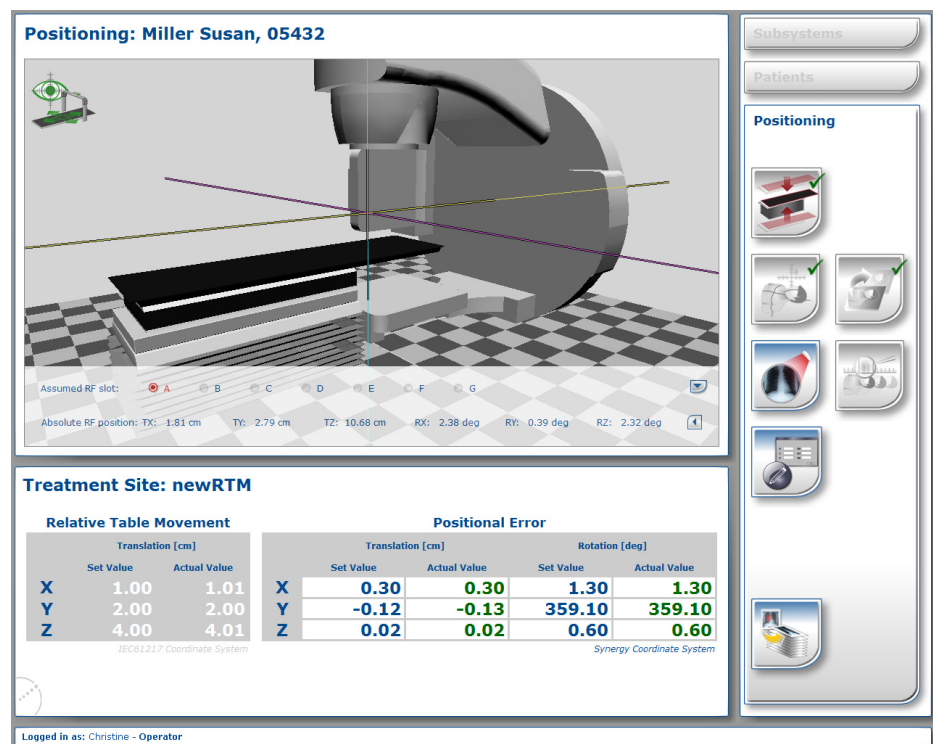


Figure 68 Positioning window

Modifying the PE Values

You have two possibilities for modifying the PE values. Please regard the different results:

- Click the **Edit PE values** button (available after step 4) to correct the entered PE values. The values will be overwritten.
- Click the **Imaging completed** button (see step 2) to define the treatment position in relation to the current position after a new scan has been performed.



Using the Imaging completed button will add the new values to the previous corrections. These moves will not be taken from the previous scan position.

6.5.3 Troubleshooting

Values too high
or wrong

If the transferred or entered values are too high, the iGUIDE software displays the following dialog box:

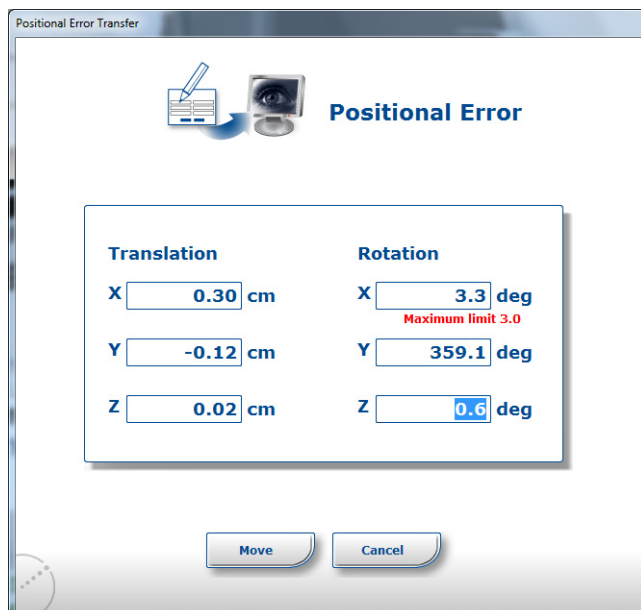


Figure 69 Too high position values

If the values of the first and second entries differs, the iGUIDE software displays the following dialog box:

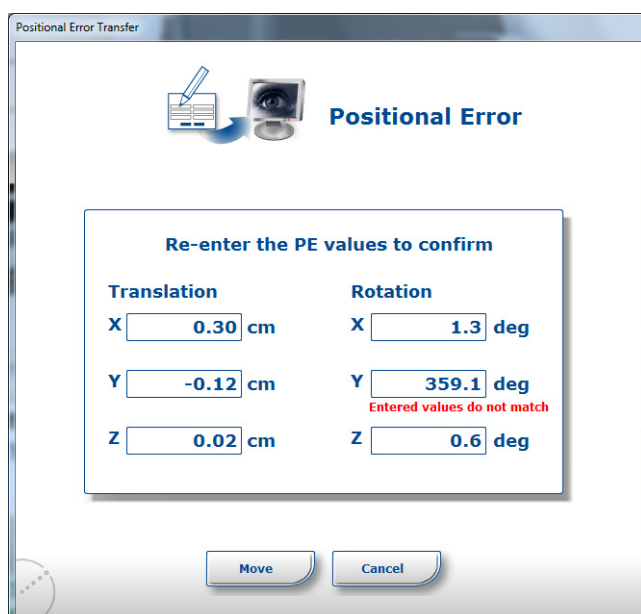


Figure 70 Wrong position values

Correct the wrong entries which are commented in red accordingly.

Only three values displayed at XVI

If the XVI system only displays **three** PE values, then the incorrect correction preset has been selected in XVI ('Precise table' instead of 'Hexapod'). For additional information, refer to the User Manual of the XVI system.

You must always enter all six values as calculated by the XVI system. If you only enter the values for translation or rotation, then the robotic couchtop will not be able to perform the PE correction.

Too many zeros

When you enter three values of 0 on the entry fields of any column, then the iGUIDE software displays the following dialog as a reminder that you must enter all six correctional position values, as calculated by the XVI system.

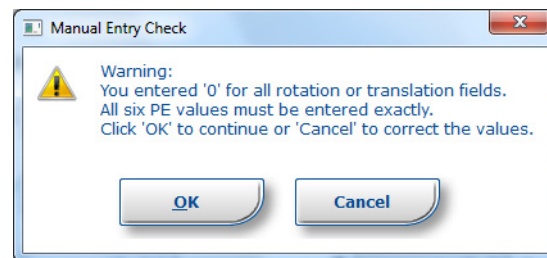


Figure 71 Zeros entered as corrections position values

Make sure that you entered all six correctional position values correctly on the corresponding fields. Only then, click **OK**.

When all values are displayed correctly in the **Positional Error** dialog box, click **Move**.

6.6

Verifying the Patient Position

The HexaPOD evo system monitors the position of the reference frame and not the patient's position. Once you have finished positioning the patient, you have to verify that the patient is in the correct position. One possibility for doing this is to compare the position of the reference frame with the position during previous fractions. Note that it only makes sense to verify the reference frame position this way if the patient is identically positioned and immobilized on the robotic couchtop (for example, with the BodyFIX system).



WARNING

- **Before you apply radiation, make sure that the patient is at the correct position.**
- **Before irradiation for stereotactic or radio-surgery treatments, it is highly recommended to perform a control XVI scan to verify the patient position. Verification of the patient position is especially important when any of the applied positional error correction values is greater than 1 mm or 1°.**

Verifying the reference frame position

When the patient is identically positioned and immobilized on the robotic couchtop and the reference frame is installed in the same slot as in a previous treatment, the position of the reference frame should be almost identical to the position during the last fraction. The iGUIDE software allows you to view the absolute position of the reference frame. Proceed as follows:

- 1 Click the arrow on the right side of the slot indicator:



Figure 72 Selected reference frame slot indication

- 2 The absolute position of the reference frame in the room is displayed. Click the arrow on the right side of the absolute reference frame position indicator:

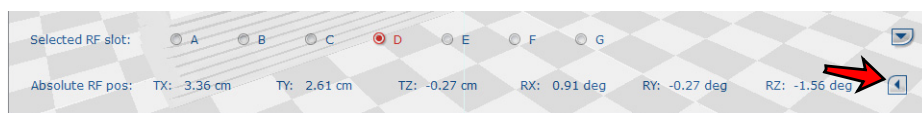


Figure 73 Absolute reference frame position

The **Reference fraction** dialog box which shows the reference frame positions of former fractions is displayed.

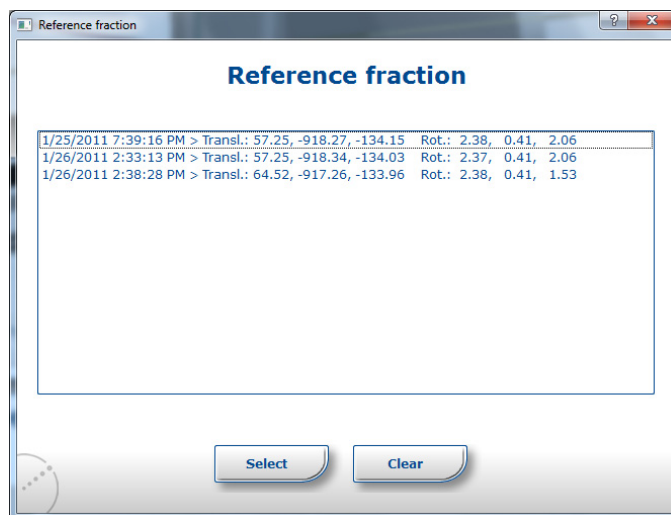


Figure 74 Reference fraction dialog box

- 3 If you want a reference frame position of a previous fraction, select the desired position and click **Select**.

The new (relative) reference frame position is shown as follows:

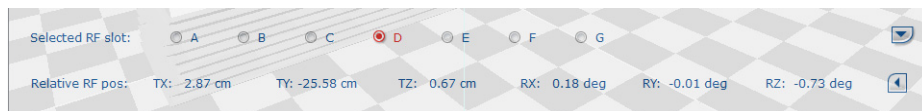


Figure 75 Relative reference frame position

6.7 Monitoring the Patient during Irradiation

Note: *During irradiation the iGUIDE software does not monitor the robotic couchtop position.*

The iGUIDE software waits for the **TREATMENT BEAM** signal to arrive from the Linac. When the **TREATMENT BEAM** signal is on, the following dialog box appears:

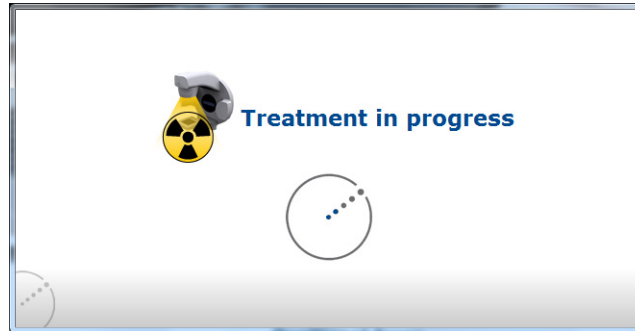


Figure 76 Treatment in progress

When the **TREATMENT BEAM** signal is on, the Position Guard is not active (also refer to [Position Guard indicator on page 82](#)) and movements of the robotic couchtop are blocked.

When the **TREATMENT BEAM** signal is off, the Position Guard is active (also refer to [Position Guard indicator on page 82](#)).



WARNING

Always monitor the patient while irradiation is in progress. Immediately stop irradiation if the patient moves.

Note: *Watch the **TREATMENT BEAM** LED on the EnableSwitch Board: If the LED stays OFF during irradiation, put the system out of service and call the technician!*

6.8 Handling the Position Guard Alert

When a fraction is open, the Position Guard monitors the position of the robotic couchtop by means of the reference frame.

If the reference frame moves, the following dialog box appears:



Figure 77 Position Guard Alert

Note: *If the reference frame is no longer visible, the dialog box has the following title: Cannot see Reference Frame! In this case, only Pause Position Guard and Abort Fraction are enabled.*

You can manually undo the movement or can select one of the buttons for more information and then click **Confirm**.

The descriptions of the buttons appear below:

Return to Imaging Position

Select this option if the position of the HexaPOD or Precise Table was unintentionally moved. The HexaPOD will be moved back to the imaging or treatment position.

Note: *Do not select this option if you moved the reference frame!*

Click **Return to Imaging Position** and acknowledge the information at the bottom of the message.

Accept Current Position

The iGUIDE software will register the current position as the new guarded position. This option is the manual override of the Position Guard. By overriding the Position Guard the user is acknowledging that the change in the position of the robotic couchtop is correct for the subsequent treatment.

Note: If you accept the current position, the former position cannot be restored.

Restart Positioning

Restart patient positioning from the beginning.

Pause Position Guard

The iGUIDE software is overridden, allowing treatments. The position guard will be reactivated when the reference frame becomes visible.

This option is only available if the position of the reference frame cannot be determined. This would occur if the reference frame was removed or if any of the markers are blocked (for example, by the touchguard or gantry).

If markers are blocked, remove any obstacles (for example, rotate the gantry 90°). Otherwise, click **Pause Position Guard** and acknowledge the information at the bottom of the message.

The iGUIDE software switches off the Position Guard and the Position Guard indicator turns red.

When the reference frame reappears, the dialog box and the indicator disappear automatically.

Note: Do not disable the Position Guard unless absolutely necessary. The Position Guard is a vital safety feature of the iGUIDE software. Only disable the Position Guard if you are absolutely sure that the modified position is correct. Avoid all further movements of the Precise Table or robotic couchtop.

Abort Fraction

The fraction will be ended. The **Patients** window will open.

The iGUIDE software displays the following dialog:

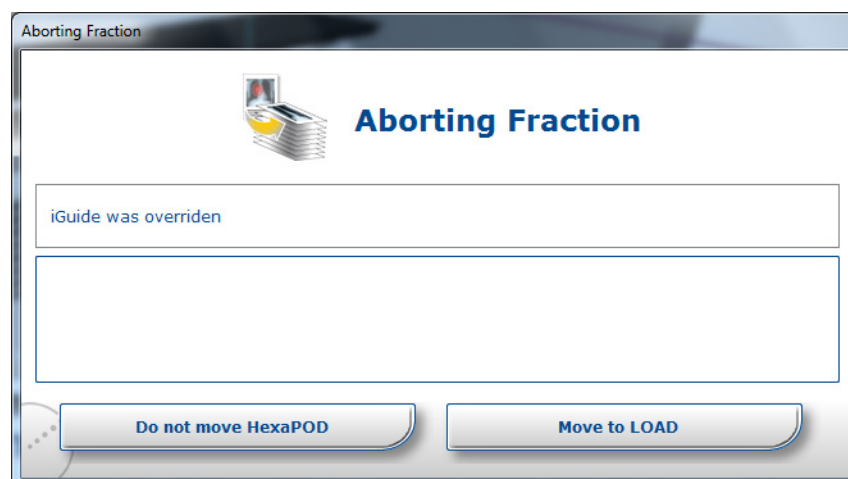


Figure 78 The Aborting Fraction dialog

Enter a comment and click the desired option.

6.9

Closing the Fraction



Once the treatment is complete, click **Close Fraction**.

Then, the iGUIDE software displays a dialog, where you can enter notes regarding the treatment. These notes are displayed with the Fraction history, see [Section 5.3.1 Displaying Information on a Treatment Site on page 72](#).

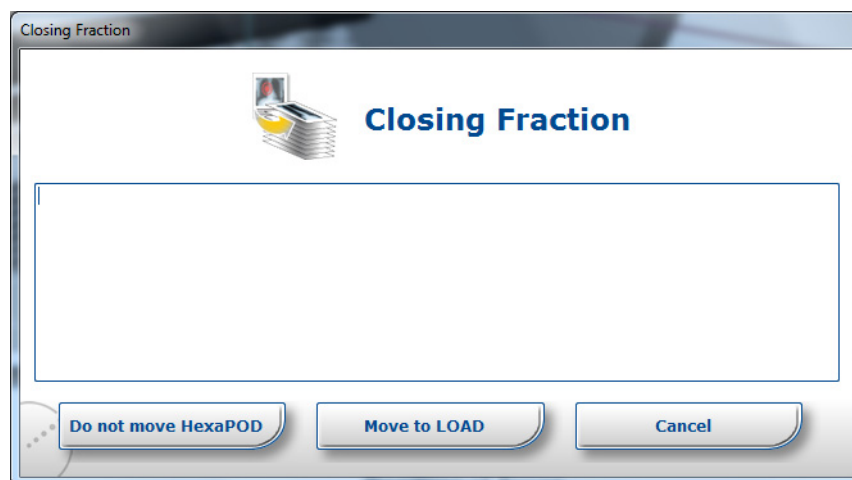


Figure 79 The Fraction notes dialog

Enter your notes if desired and click the desired movement button to save the Fraction notes, to perform the movement and to finally close the treatment fraction.

If you clicked **Close Fraction** accidentally, then click **Cancel** to return.

The fraction is now complete. The iGUIDE software will no longer set the **EXTERNAL INHIBIT** signal. To treat another patient, click the **Patients** button and follow the instructions from [Section 6.2 Starting the Patient Positioning on page 84](#) onwards.

Note: *If you will treat the next patient without the iGUIDE software, move the robotic couchtop to the **LOAD** position.*

Troubleshooting

If the patient was not treated before **Close Fraction**, there will be an **Abort Fraction** button instead of **Close Fraction**. You will receive a confirmation message by the iGUIDE software:

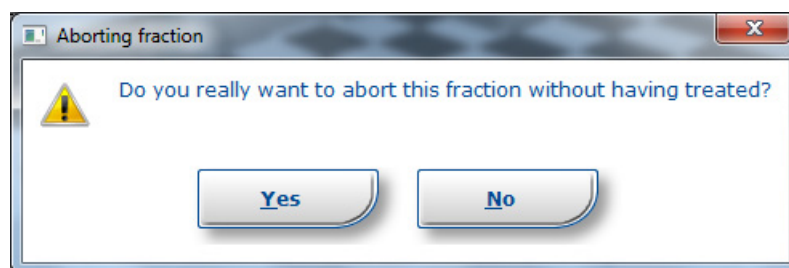


Figure 80 Aborting Fraction confirmation

If you click **Yes**, the following dialog box will appear (description see above):

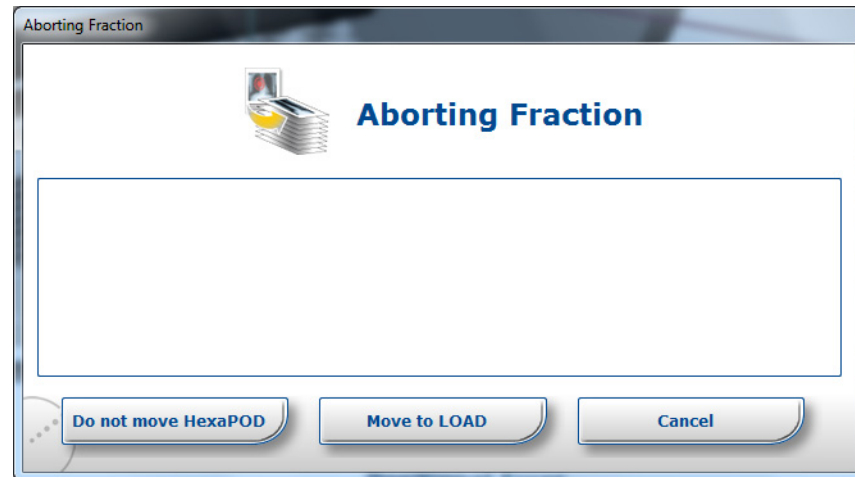


Figure 81 Aborting Fraction dialog

Note: After closing or aborting a fraction, the Position Guard gets deactivated.

Deactivating the iGUIDE Software during a fraction

If a fraction is open and you turn the **iGUIDE** key to **iGUIDE OFF**, the following dialog box appears:

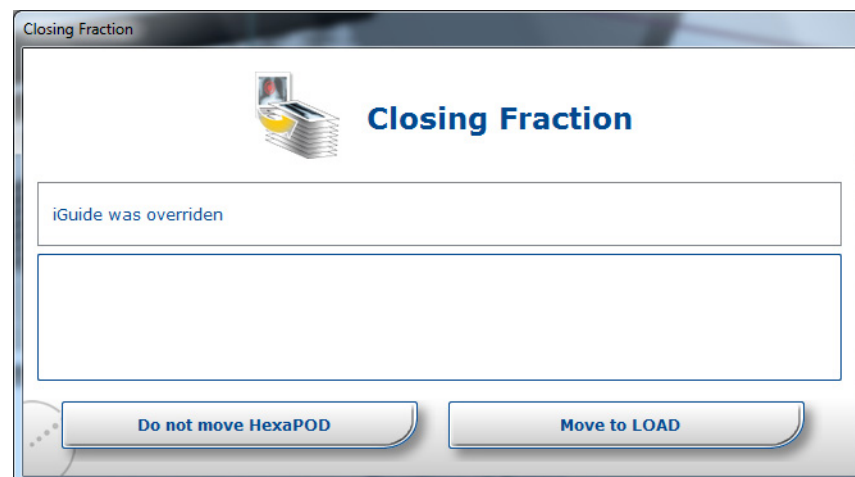


Figure 82 Closing the fraction using the **iGUIDE** key

The fraction will be closed and the login window is opened.

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7 Managing the iGUIDE Software

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7.1 iGUIDE Software Management Tasks

The **iGUIDE Administrator** in the clinic is responsible for performing the following tasks in the iGUIDE software:

- Managing users
- Supporting users
- Performing some basic troubleshooting
- Performing basic system configuration
- Starting remote service sessions

This chapter contains the information the **iGUIDE Administrator** requires for these tasks.

Note: Standard users do not have access to the functions shown in this chapter.

Opening the Desktop

When the iGUIDE workstation starts, the iGUIDE user will automatically be logged in (see the following section for details) and the iGUIDE login will appear.

To log in onto the Windows desktop, click **Exit**.



Figure 83 iGUIDE login

The iGUIDE software will shut down and the Windows login will appear.

Click the **iGUIDE Administrator** account and enter your password.

The Windows desktop will appear. You have access to the iGUIDE software management tools from the desktop.

Table 16 Symbols on the desktop


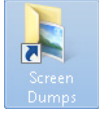


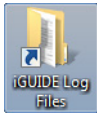


Symbol	Description
	Opens the iGUIDE user manager. You can use the user manager to add or delete iGUIDE users or reset an iGUIDE user's password. See Section 7.2 Managing iGUIDE Users on page 106 .
	Opens a folder that contains screen dumps. The screen dumps may have been taken by a user upon encountering problems. See Section 7.3 Getting Information from Users on page 108 .

Table 16 Symbols on the desktop

Symbol	Description
	Opens a folder with various tools for troubleshooting. See Section 7.6 Diagnostic Tools on page 114 .
	Starts the iGUIDE software.
	Opens a folder with log files from the HexaPOD evo system. The manufacturer may request these files for assistance during debugging.
	Opens a tool for basic configuration of the HexaPOD evo system. See Section 7.6.6 Configuring the HexaPOD evo RT System on page 117 .
	Initiates a remote session with the IntelliMax software. You should only start remote sessions if requested by remote support personnel. See Starting an IntelliMax Remote Session on page 116 .

7.2 Managing iGUIDE Users

There are two levels of user management on the iGUIDE workstation:

- Windows user management
The Windows user management controls the access to the Windows desktop. The iGUIDE workstation is delivered with the following Windows user accounts:
 - **iGUIDE:** When the iGUIDE workstation starts, this user account is automatically logged in (no password). The iGUIDE software then opens. This user account can only be used for running the iGUIDE software.
 - **iGUIDE Administrator:** This user account is for the person in the clinic responsible for managing the iGUIDE workstation.
 - **Elekta Service User:** This user account is for service.
 - **Administrator:** For use by the manufacturer only.
- iGUIDE user management
When the iGUIDE software is running, it controls permissions to perform functions and access data, depending on the users rights.
It is recommended that every user has his/her own individual user account.

iGUIDE User Manager

The **Elekta Service User** and the **iGUIDE Administrator** have access to the iGUIDE User Manager. They can add, edit and delete users.

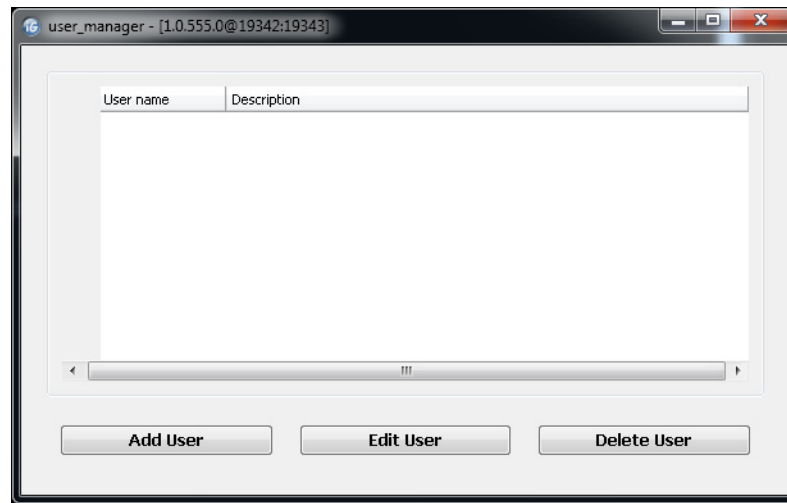


Figure 84 iGUIDE User Manager

iGUIDE User Rights

As can be seen in this dialog box, iGUIDE users can have the following sets of rights:

- **Operator**
Users with **Operator** rights can perform treatments and set up new patients and edit patient data.
- **Administrator**
Users with **Administrator** rights can perform the system calibration and have access to the Windows desktop and some diagnostic tools. Inform the customer representative that only users that have been trained for the system calibration are allowed to have **Administrator** rights.

The following table shows some typical settings:

Table 17 iGUIDE user rights

Users	Operator	Administrator
Normal user	X	
iGUIDE Administrator (plans and performs treatments, also responsible for managing the HexaPOD evo system)	X	X
Service		X

Recommendations for the User Rights

It is recommended that the following users be set up:

- Set up a separate user for each user who will be performing treatments. These users should have only **Operator** rights.
- Only the **iGUIDE Administrator** and service users should receive **Administrator** rights. Users who perform the system calibration procedure need to have **Administrator** rights.

7.3 Getting Information from Users

If users run into a problem, they can save the monitor contents and a comment that you can look at later.

When a user presses the **PRINT** button on the keyboard, a dialog box opens showing the current screen and providing a field for comments.

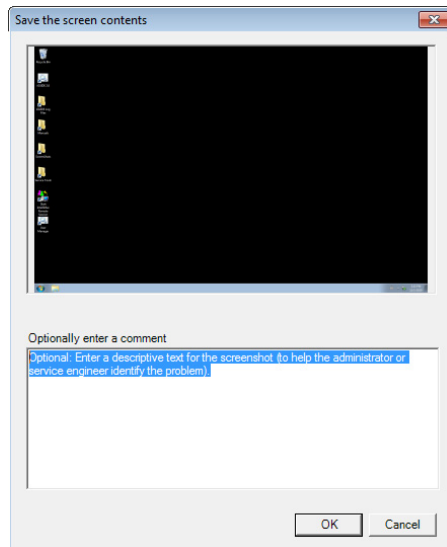


Figure 85 Saving screen contents

Double-click the **Screenshots** symbol on the desktop to view the current screenshots. Screenshots and comments are saved under the following names:

Screenshots: **Screen_dump_YYYY-MM-DD_hhmmss.png**
Comments: **Screen_dump_YYYY-MM-DD_hhmmss.txt**

7.4 Identifying Startup Problems

When the iGUIDE software starts, it sets up communication with its communication partners. Once communication has been established, the safety checks have to be passed.

The symbols in the **System Overview** window show the status of the communication partners:

- **Green:** Communication OK, all safety checks have been passed.
- **Red:** Error (safety checks not possible).
- **Yellow:** Communication OK, at least one safety check not passed.

Table 18 Identifying startup problems







Symbol	Description
	HexaPOD Make sure that the powerbox and robotic couchtop have been switched on. Ping the powerbox. If the powerbox does not respond to the ping, contact service.
	Camera Make sure that the powerbox has been switched on. Ping the powerbox. If the powerbox does not respond to the ping, contact service.

Table 18 Identifying startup problems

Symbol	Description
	Signal Interface Make sure that the powerbox has been switched on. Ping the powerbox. If the powerbox does not respond to the ping, contact service.
	Measuring System(s) Make sure that the XVI system has been switched on. Restart the XVI system while the iGUIDE software is running. Ping the XVI system. If the XVI system does not respond to the ping, contact service.
	Isocenter Manager There is no valid isocenter, system calibration is necessary. See the 09-001-1078 HexaPOD evo RT System; iGUIDE 2.0 Set-to-Work Manual for instructions.
	Tools There is no valid ROM file for the reference frame or calibration tool. Install the ROM file from CD. See Section 7.6.3 Installing ROM Files on page 116 .

You can click a symbol to open a status box with relevant actions.

Note:

When you click a symbol with the right mouse button, the properties of the selected equipment are shown. See [Section 7.8 HexaPOD evo RT System Property Screens on page 119](#).

The following status boxes appear when you click a symbol with the **left mouse button**:

Table 19 iGUIDE Software status boxes

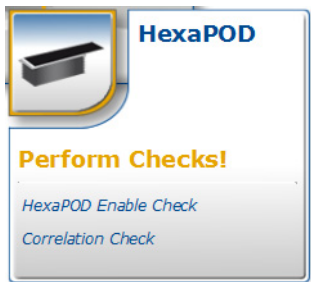





Status box	Status box items
	<ul style="list-style-type: none"> • HexaPOD Enable Check Ensures that the buttons required for enabling movements are not stuck. See Running the HexaPOD Enable Check on page 111. • Correlation Check Moves the robotic couchtop and checks if the movements measured by the camera correlate with the expected movements. See Running the Correlation Check on page 111.

Table 19 iGUIDE Software status boxes

Status box	Status box items
 Camera Perform Checks! Correlation Check	<ul style="list-style-type: none"> Correlation Check Moves the robotic couchtop and checks if the movements measured by the camera correlate with the expected movements. See Running the Correlation Check on page 111.
 Signal Interface Perform Checks! Interlock Check	<ul style="list-style-type: none"> Interlock Check Activates and releases the EXTERNAL INHIBIT signal (DOOR 3) to ensure the EXTERNAL INHIBIT signal is detected by the Linac. See Running the Interlock Check on page 112.
 Measuring System(s) Ready	<ul style="list-style-type: none"> No actions available.
 Isocenter Manager Perform Checks! Alignment Check System Calibration	<ul style="list-style-type: none"> Alignment Check Aligns the reference frame with the lasers. See Running the Alignment Check on page 113. System Calibration Starts the system calibration procedure. See the 09-001-1078 HexaPOD evo RT System; iGUIDE 2.0 Set-to-Work Manual.
 Reference Frame Ready Serial Number:	<ul style="list-style-type: none"> Serial Number: Shows the serial number of the reference frame in the database. This must match the serial number of the physical reference frame.

7.5 Running the Daily Safety Checks

The following safety checks are run at the beginning of the day. These safety checks must be successfully passed before patients can be treated.

- **HexaPOD Enable Check**
- **Correlation Check**
- **Interlock Check**
- **Alignment Check**

If a safety check was not successful, the status of the subsystems affected by the safety check will be shown as yellow. You can restart a single safety check by clicking the symbol with the left mouse button and clicking the failed safety check.

Running the HexaPOD Enable Check

The **HexaPOD Enable Check** checks if the **OPERATE** buttons on the ESB and the **OPERATE** button and **ENABLE** buttons on the HHC are locked in the **ON** position. In this condition, any movement requests sent to the robotic couchtop would be carried out immediately (which would pose a safety risk).

To run the **HexaPOD Enable Check**:



- 1 Click the **HexaPOD** symbol with the left mouse button.
The **HexaPOD** status box opens.
- 2 Click **HexaPOD Enable Check**.

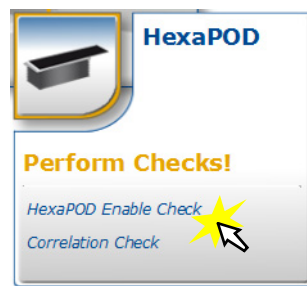


Figure 86 Starting the HexaPOD Enable Check

No additional user interaction is required during the **HexaPOD Enable Check**.

Running the Correlation Check

During the **Correlation Check**, the iGUIDE workstation sends movement commands to the robotic couchtop. The camera verifies that the robotic couchtop moves as expected.

To run the **Correlation Check**:

- 1 Mount the reference frame in slot (A).

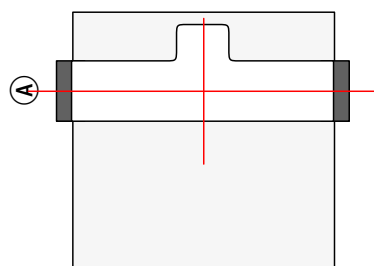


Figure 87 iGUIDE Reference Frame in slot (A)



- 2 Click the **HexaPOD** symbol with the left mouse button.
The **HexaPOD** status box opens.
- 3 Click **Correlation Check**.

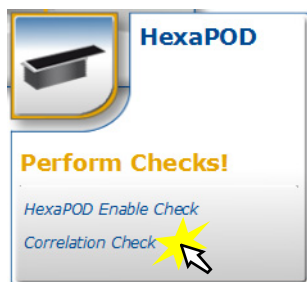


Figure 88 Starting the Correlation Check

- 4 Enable the movements (with the HHC or ESB).
No additional user interaction is required during the **Correlation Check**.

Running the Interlock Check

The **Interlock Check** ensures that the HexaPOD evo RT System can prevent the Linac from radiating when the patient is not in the treatment position. It sets the Linac's **EXTERNAL INHIBIT** signal (may be called **DOOR 3** in older systems).

Note: *Other equipment connected to the Linac may set the EXTERNAL INHIBIT.*

To run the **Interlock Check**:

- 1 Ensure that there is currently no **EXTERNAL INHIBIT** signal on the Linac.
- 2 Click the **Signal Interface** symbol with the left mouse button.
The **Signal Interface** status box opens.
- 3 Click **Interlock Check**.

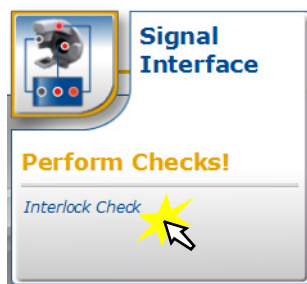


Figure 89 Starting the Interlock Check

The signal interface sets the **EXTERNAL INHIBIT** signal and prompts you as to whether the **EXTERNAL INHIBIT** signal is visible on the Linac.

- 4 If the **EXTERNAL INHIBIT** signal is indicated on the Linac (which should be the case), click **EI set**.

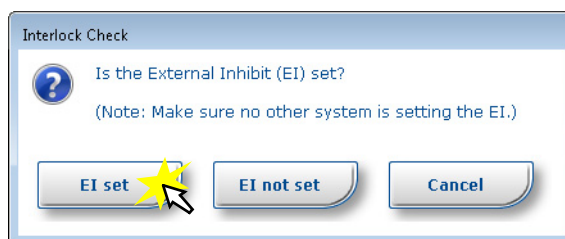


Figure 90 Verifying that the **EXTERNAL INHIBIT** Signal is set

The signal interface now releases the interlock. The iGUIDE software prompts you again as to whether the **EXTERNAL INHIBIT** signal is visible on the Linac.

- 5 If the **EXTERNAL INHIBIT** signal is no longer visible (which should be the case), click **EI not set**.

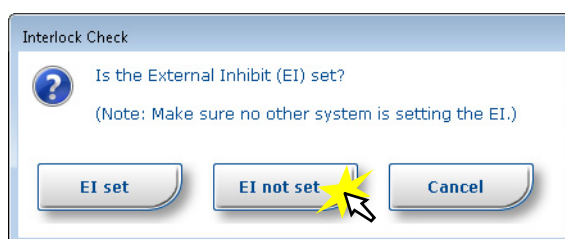


Figure 91 Verifying that the **EXTERNAL INHIBIT** Signal is released

Note: If the **EXTERNAL INHIBIT** is still visible, check if it may be coming from other equipment.

Running the Alignment Check

The **Alignment Check** moves the robotic couchtop so that the reference frame is aligned to the room lasers. This allows you to verify that the calibration has not been changed (which occurs, for example, if the camera is moved).

To run the **Alignment Check**:

- 1 Click the **Isocenter Manager** symbol with the left mouse button.
The **Isocenter Manager** status box opens.
- 2 Click **Alignment Check**.

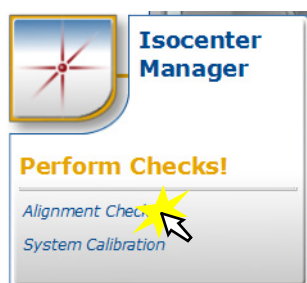


Figure 92 Starting the Alignment Check

- 3 When prompted, mount the reference frame to the robotic couchtop and click **OK**.

The iGUIDE software sends movement commands to the robotic couchtop. It may be necessary to first move the Precise Table. You have to enable the movements of the robotic couchtop (using the HHC or ESB).

- 4 When the reference frame has reached the registered location, the iGUIDE software prompts you as to whether the reference frame is in the lasers.

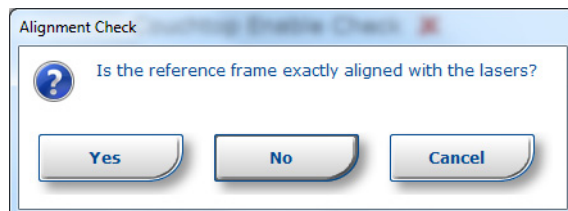


Figure 93 Verifying the alignment of the iGUIDE Reference Frame to the lasers

- 5 Respond to the prompt as follows:
 - Click **Yes** if the reference frame is aligned to the lasers.
 - Click **No** if the reference frame is not aligned to the lasers.
 - Click **Cancel** to cancel the **Alignment Check**.

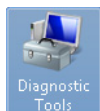
Note that it will not be possible to treat patients using the HexaPOD evo system until the **Alignment Check** has been passed.

The **Alignment Check** will fail, for example, if:

- The room lasers were adjusted.
- The camera was moved.

7.6

Diagnostic Tools


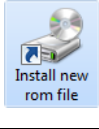
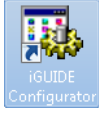



When you click the **Diagnostic Tools** symbol on the desktop, a folder opens with the following advanced troubleshooting tools:

Table 20 Diagnostic Tools

Symbol	Description
A small icon showing a folder with a red question mark and the text "List Image Versions".	Displays the current versions of software components used by the iGUIDE software. The manufacturer may request you to provide image versions in case of problems.
A small icon showing a computer monitor and a green checkmark with the text "Ping Powerbox".	Checks the network communication with the powerbox. See Pinging the HexaPOD Powerbox, XVI Workstation or Network Security Solution on page 115 .
A small icon showing a computer monitor and a green checkmark with the text "Ping XVI".	Checks the network communication with the XVI workstation. See Pinging the HexaPOD Powerbox, XVI Workstation or Network Security Solution on page 115 .
A small icon showing a computer monitor and a green checkmark with the text "Ping NSS".	Checks the network communication with the NSS. See Pinging the HexaPOD Powerbox, XVI Workstation or Network Security Solution on page 115 .

Table 20 Diagnostic Tools

Symbol	Description
	Shows the network configuration of the iGUIDE workstation. See Viewing the Network Configuration on page 116 .
	Starts the ROM file installer, which is used to copy the ROM file of a reference frame or calibration tool from the CD. See Installing ROM Files on page 116 .
	Opens the iGUIDE Configurator for performing basic configuration of the HexaPOD evo system. See Section 7.6.6 Configuring the HexaPOD evo RT System on page 117 .
	For use by remote service personnel only during IntelliMax sessions.

7.6.1

Pinging the HexaPOD Powerbox, XVI Workstation or Network Security Solution

If you suspect network communication problems with the powerbox or the XVI workstation, you can try pinging the powerbox, the XVI workstation or the NSS by double-clicking the corresponding symbol.

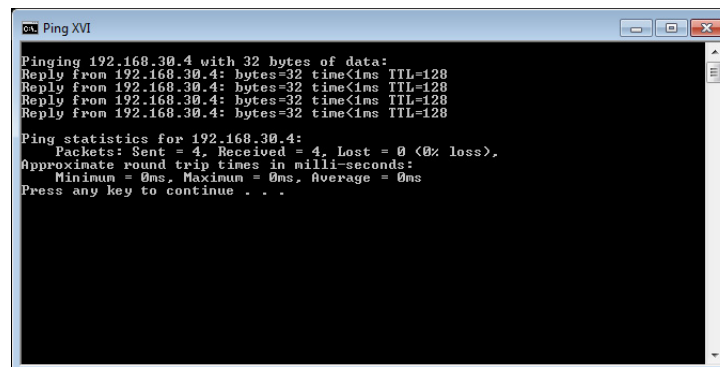


Figure 94 Pinging XVI

7.6.2 Viewing the Network Configuration



When you double-click the **Show Ethernet Config** symbol, a Windows console opens with the current ethernet configuration.

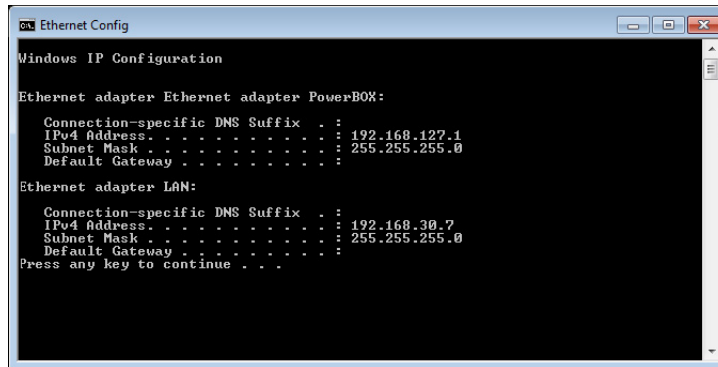


Figure 95 iGUIDE Workstation ethernet configuration

The iGUIDE workstation was delivered with two network cards with the following IP configurations:

- **NPort Connection** (to powerbox):
 - **IP Address:** 192.168.127.1
 - **Subnet Mask:** 255.255.255.0
 - **Default Gateway:** None
- **Local Area Connection** (to NSS):
 - **IP Address:** 192.168.30.7
 - **Subnet Mask:** 255.255.255.0
 - **Default Gateway:** None

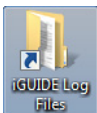
7.6.3 Installing ROM Files



The ROM files contain the geometric data of the reference frame and calibration tool. Only one ROM file for each tool type is required. If the reference frame or calibration tool is switched, the ROM file must be loaded from the corresponding CD.

To install a ROM file, place the CD in the CD drive of the iGUIDE workstation and click the **Install new rom file** symbol.

7.6.4 Getting iGUIDE Log Files



The iGUIDE software writes log files to the **iGUIDE Log Files** folder on the desktop. The manufacturer may ask you to send the most recent log files for assistance in debugging.

The manufacturer may also ask you to change the log level. This defines the level of information written to the log file. See [Section 7.6.6 Configuring the HexaPOD evo RT System on page 117](#) for information on how to change the log level.

7.6.5 Starting an IntelliMax Remote Session



When you click **Start IntelliMax Remote Session**, the IntelliMax software on the iGUIDE workstation opens a connection to an IntelliMax server. Remote support personnel can log into the IntelliMax server and set up a remote desktop to the iGUIDE workstation. This allows you to get quick assistance for problems with the iGUIDE workstation.

The IntelliMax remote session stays active until:

- You click **End session** in the **IntelliMax Connect** box.
- You log off.
- The remote personnel ends the session.

Note:

As long as the Session status is active, remote personnel have access to the iGUIDE workstation. When you end the active IntelliMax session, no remote access to the iGUIDE workstation is possible.

7.6.6

Configuring the HexaPOD evo RT System



When you click the **iGUIDE Configurator** symbol, the iGUIDE Configurator appears:

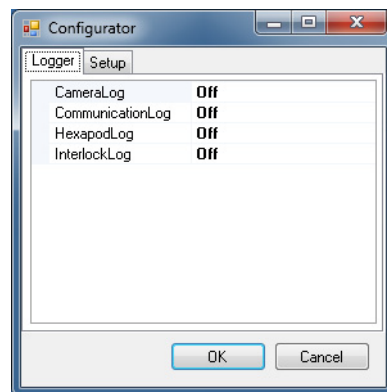


Figure 96 iGUIDE Configurator (Logger)

The iGUIDE Configurator is used for making some basic hardware settings and for defining the log level.

Logger

Normally, the log level for all logs should be **Off**. If you run into problems with the system, you may be requested to activate logging.

Setup

You have the following possibilities for setting up the HexaPOD evo system:

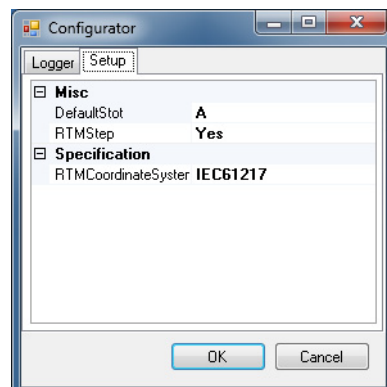


Figure 97 iGUIDE Configurator (Setup)

Misc:

- **DefaultSlot**

Defines the slot in which the reference frame is assumed to be located for treatments. It has no effect on the **Correlation Check**.

- **RTMStep**

Defines whether the HexaPOD evo system is responsible for performing Relative Table Movements (RTMs).

Note:

When you deactivate RTMs, RTMs for any treatment sites that are opened in the iGUIDE software will be deleted. They will not be restored when RTMs are reactivated.

Specification:

- **RTMCoordinateSystem**

Defines the coordinate system used for RTMs.

7.7 Getting Support

If you are not able to resolve the problem yourself, you can contact the manufacturer for support. You can help the manufacturer support you as follows:

- Take screen dumps and provide descriptive comments (by pressing the **PRINT** button, see [Section 7.3 Getting Information from Users on page 108](#)).
- Get the most recent log files from the iGUIDE software. See [Section 7.6.4 Getting iGUIDE Log Files on page 116](#).
- When requested by the manufacturer, start a remote service session so that the manufacturer representatives have direct access to the iGUIDE workstation. See [Section 7.6.5 Starting an IntelliMax Remote Session on page 116](#).

7.8 HexaPOD evo RT System Property Screens

You can view the properties of one of the subsystems by clicking the corresponding symbols with the right mouse button.

Note: Only users with Administrator rights have access to the property screens.

HexaPOD Properties

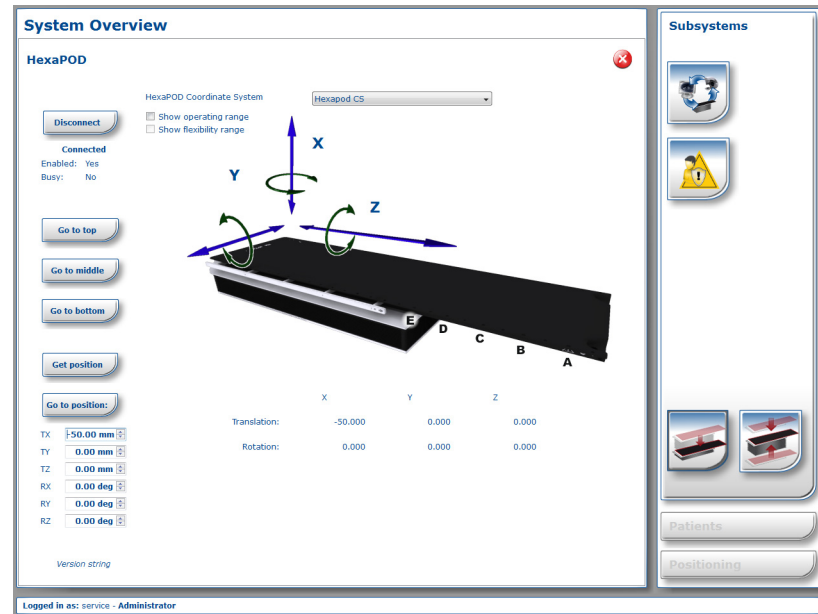
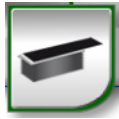


Figure 98 HexaPOD properties

The following properties are available for the **HexaPOD**:

Table 21 HexaPOD properties

Element	Description
Disconnect / Connect button	Disconnects / connects the communication to the robotic couchtop. Use this button for testing the communication (for example, if the robotic couchtop does not react to commands).
Go to top button	Sends a movement request to the robotic couchtop to move to the uppermost position. The movement must be enabled (using the HHC or ESB).
Go to middle button	Sends a movement request to the robotic couchtop to move to a position 50 mm above the LOAD position. The movement must be enabled (using the HHC or ESB).
Go to bottom button	Sends a movement request to the robotic couchtop to move to the LOAD position (lowest position). The movement must be enabled (using the HHC or ESB).
Get position button	Requests the current position of the robotic couchtop and puts it in the position fields.
Go to position: button	Sends a movement request to the robotic couchtop to move to the position defined in the position fields. The movement must be enabled (using the HHC or ESB).

Table 21 HexaPOD properties

Element	Description
Position fields	Shows the current position of the robotic couptop or the position to be moved to.
HexaPOD Coordinate System list	Selects the coordinate system used to show the position data. This selection has no effect on the operation of the HexaPOD evo system.
Show operating range option	Switches on and off the display of the movement ranges.
Show flexibility range option	This option can only be selected if Show operating range is selected. It switches on and off the display of the limits.

Signal Interface Properties



Figure 99 Signal Interface properties

The following properties are available for the **Signal Interface**:

Table 22 Signal Interface properties

Element	Description
Disconnect / Connect button	Disconnects / connects the communication to the signal interface in the powerbox.
Signal states	Shows the states of the following signals: <ul style="list-style-type: none"> • Internal error Contact the manufacturer if this state occurs. • Inhibit override This signal indicates the status of the iGUIDE key (No = iGUIDE OFF, Yes = iGUIDE ON). • LINAC READY This signal indicates that no equipment is inhibiting robotic couchtop movements. This signal is No if the touchguard is pressed or the STOP MOTORS button has been activated. • TREATMENT BEAM This signal should normally be No. It is active when the Linac is radiating. • EXTERNAL INHIBIT Indicates if the iGUIDE workstation is setting the EXTERNAL INHIBIT signal (which prohibits the Linac from radiating).
Set EXT INHIBIT button	Activates the EXTERNAL INHIBIT signal for testing purposes.
LEDs	The LEDs at the bottom of the screen correspond to the input signals in the signal interface in the powerbox.

Camera Properties

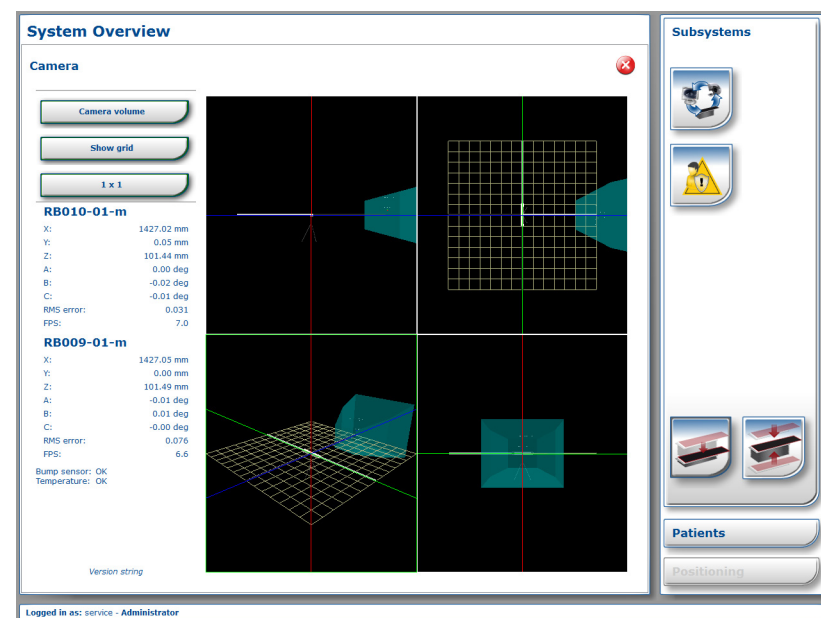


Figure 100 Camera properties

The following properties are available for the **Camera**:

Table 23 Camera properties

Element	Description
Camera volume button	Shows or hides the display of the volume being tracked. All markers of the reference frame or calibration tool must be within this volume to be tracked.
Show grid button	Shows or hides the grid.
1 x 1 / 2 x 2 button	Switches between a 1 x 1 display (one perspective) or 2 x 2 display (4 perspectives)
Current positions	Shows the current tracked positions of the reference frame and calibration tool.
Display	Shows different perspectives of the treatment area.

Measuring System(s) Properties



Figure 101 Measuring System(s) properties

The following properties are available for the **Measuring System(s)**:

Table 24 Measuring System(s) properties

Element	Description
Disable / Enable button	Disables / enables the data transfer function.
Disconnect / Connect button	Disconnects / connects the communication to the measuring system.
Imaging history	Shows the connection and data transfer events for the current session.

Tools Properties

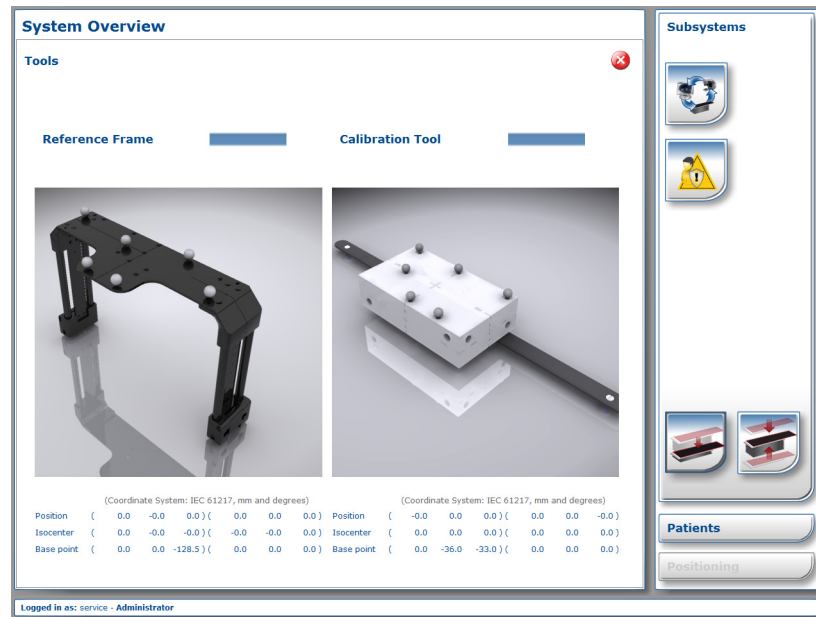


Figure 102 Tools properties

The following properties are available for the **Tools**:

Table 25 Tools properties

Element	Description
Reference Frame	Provides the geometric data of the reference frame in respect to the isocenter.
Calibration Tool	Provides the geometric data of the calibration tool in respect to the isocenter.
<ul style="list-style-type: none"> Position Isocenter Base point 	Values used for the internal calculation of the reference frame or calibration tool position.

Isocenter Manager Properties

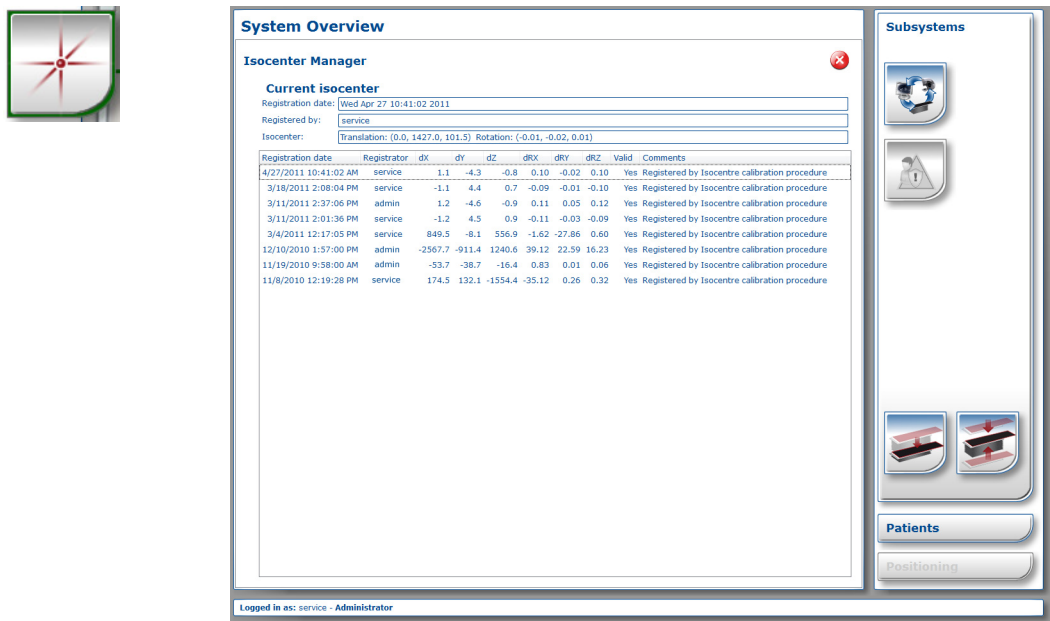


Figure 103 Isocenter Manager properties

The following properties are available for the **Isocenter Manager**:

Table 26 Isocenter Manager properties

Element	Description
Current isocenter	Shows the date, user and coordinates of the currently valid isocenter.
Isocenter list	Shows the isocenter history. The entries show the position of the currently registered isocenter in relation to the previously registered isocenter.

8 Description of the System Components

Section	Title	Page
8.1	Overview of the Components	127
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8.3	HexaPOD evo RT Couchtop	128
8.4	Tabletop of the HexaPOD evo RT Couchtop	131
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8.1 Overview of the Components

You will find a figure which shows the components of a HexaPOD evo system in [Section 2.2 Components of the HexaPOD evo RT System on page 30](#).

8.2 HexaPOD Powerbox

The powerbox is located in the equipment room and supplies the robotic couchtop and the camera with power. The main power switch is on the front side of the powerbox.

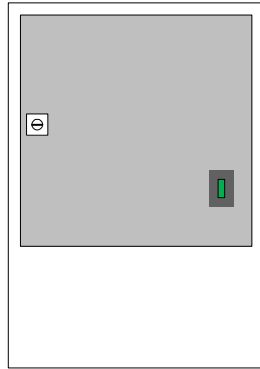


Figure 104 HexaPOD Powerbox

Push the mains switch to switch on or off the powerbox.

Note: *The powerbox is only powered if the Linac power is ON.*

8.3 HexaPOD evo RT Couchtop

The following figure shows the robotic couchtop with the control panel which is drawn to a larger scale on the right side.

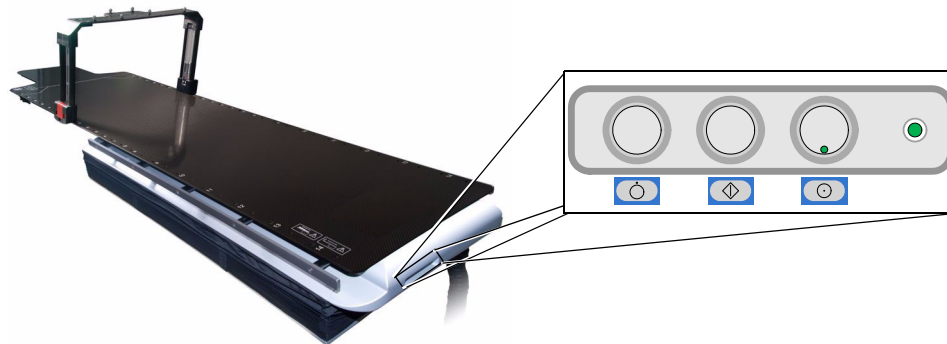
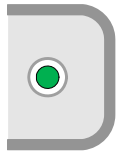
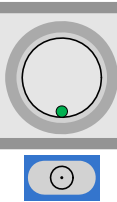

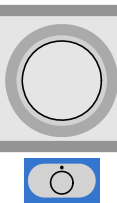


Figure 105 HexaPOD evo RT Couchtop with control panel

Table 27 Buttons on the robotic couchtop control panel

Symbol	Description
	POWER LED ON: The robotic couchtop is getting power from the powerbox. OFF: No power to robotic couchtop.
	HexaPOD ON Button, HexaPOD ON LED The HexaPOD ON button is used to switch on the robotic couchtop. The HexaPOD ON LED lights up when the robotic couchtop is booting or on.
	LOAD Button Press this button with the ENABLE buttons on the HHC to move the robotic couchtop to the LOAD position.
	HexaPOD OFF Button Press and hold this button until the robotic couchtop shuts down (~ 4 seconds).

Operating the robotic couchtop

For a description of how to operate the robotic couchtop, please refer to [Section 3.1.3 Switching on and off the HexaPOD evo RT Couchtop on page 40](#) and to [Section 3.3.2 Enabling HexaPOD evo RT Couchtop Movements on page 46](#).

Positioning Range of the HexaPOD evo RT Couchtop

The robotic couchtop has six independently operating lifting units that give it six degrees of freedom. The lifting units allow the robotic couchtop to be precisely positioned *translationally* (along all three axes) and *rotationally* (around all three axes) within the specified movement limits.

The robotic couchtop has two primary operating positions: the **LOAD** position and the **START** position.

The **LOAD** position is the lowest position and is used to help patients onto and off of the robotic couchtop. The **START** position is the position used to start positioning. It is the position in which the robotic couchtop has the largest range of movement for positioning.

The following figure provides an overview of the positioning range.

Note: *The following figure gives an approximation of the movement range of the robotic couchtop.*

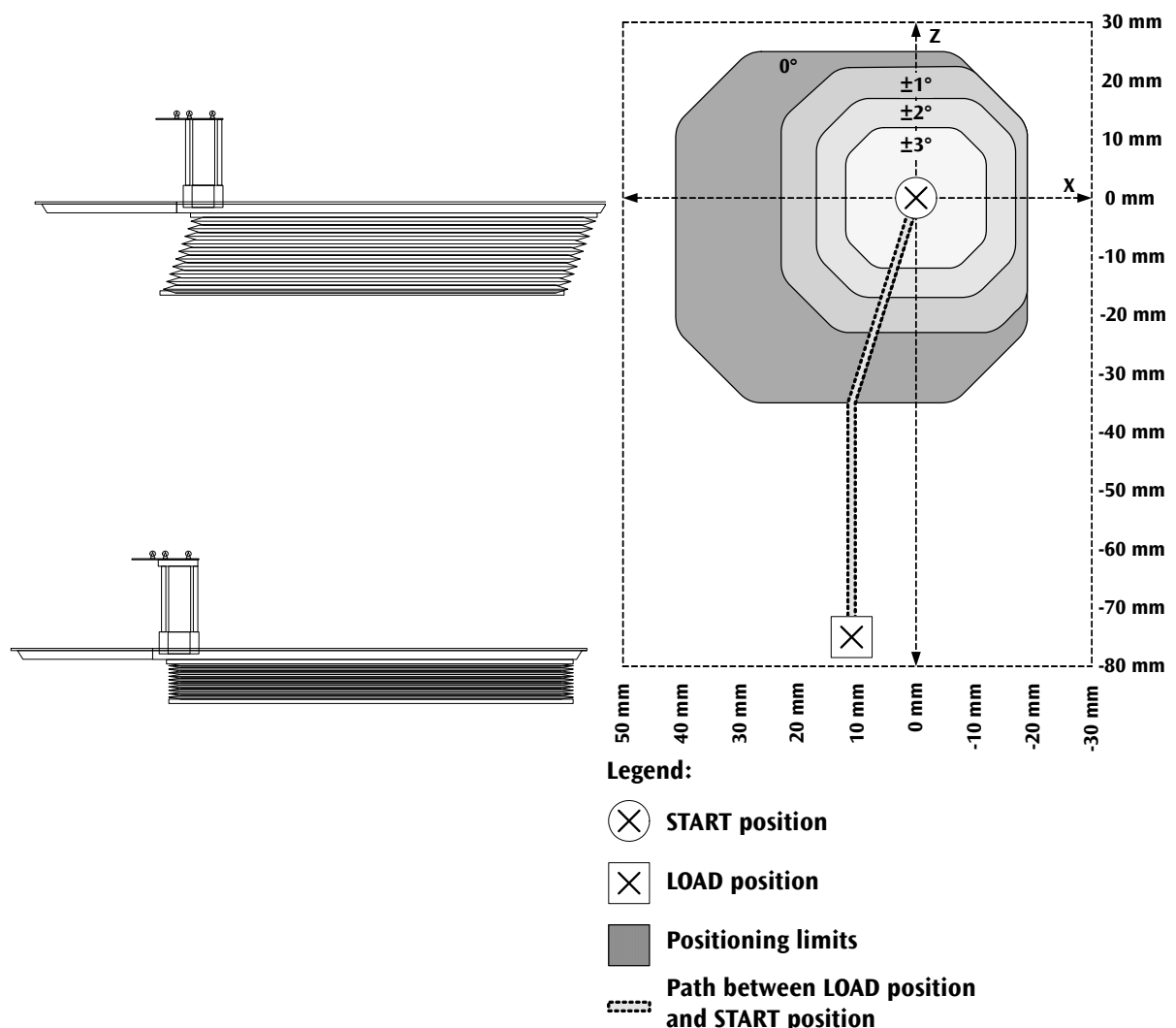


Figure 106 Movement range of the robotic couchtop

As indicated in this figure, the following movement range for positioning is available from the **START** position:

Table 28 Positioning range

X axis (to/from gantry)	Y axis (left/right)	Z axis (up/down)
+ 41 mm	+ 30 mm	25 mm
-19 mm	- 30 mm	-35 mm

Positioning outside of this range is not possible.

As indicated in the previous figure, the full rotational range (3° around all three axes) is only available when the robotic couchtop is within 12 mm from the **START** position. When the robotic couchtop is further than 12 mm from the **START** position, the rotational range is reduced accordingly.



- **Make sure that the camera is powered for at least 30 minutes before you perform the daily safety checks.**
- **Never make changes, additions or maintenance to the equipment if you do not have appropriate qualifications and training. Never use spare parts that are not supplied or explicitly approved by the manufacturer.**

This relation is shown in the following figure.

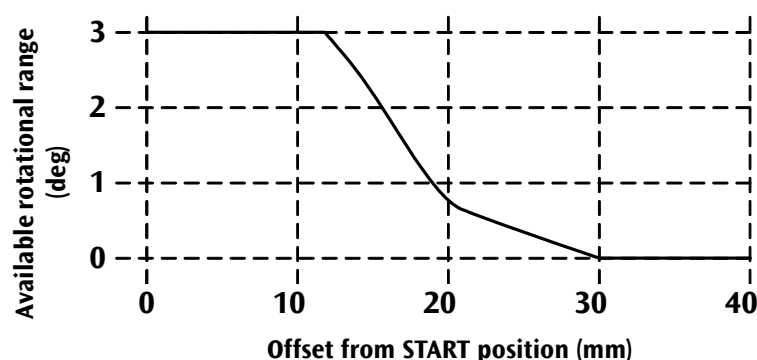


Figure 107 Translational and rotational dependency

Note:

The available rotational range is the maximum value for all three axes. If the robotic couchtop is only to be rotated around one axis, the available rotational range will be higher.

8.4 Tabletop of the HexaPOD evo RT Couchtop

The tabletop of the robotic couchtop is a carbon-fibre tabletop solution based on the Medical Intelligence iBEAM evo Couchtop. There are several adaptable extensions available for the tabletop in order to make it suitable for clinical requirements.

Note: *A damaged carbon-fibre tabletop cannot be repaired. Handle the tabletop with care!*

Integrated indexing system

Indexing systems add position references to couch tops and thus minimise both setup time and positioning errors. They aid the precise localisation and (re-)positioning of patients on the treatment couch. Furthermore, the patient position is always aligned with the table's X and Y axes. Refer to the **P10105-152 iBEAM evo Couchtop User Manual** for further information.

Accessory rails

The robotic couchtop has fixed rails on both sides of the tabletop (① in [Figure 108](#)) which can be used to fix accessories. Do not attach heavy accessories with long attachments.

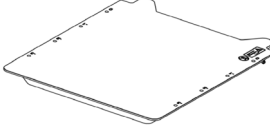
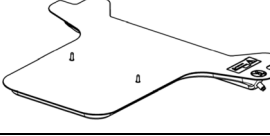


Do not exceed the maximum load of the accessory rails (40 kg; 88 lb).

8.4.1 Extensions to the HexaPOD evo RT Couchtop

You can expand the tabletop of your robotic couchtop with extensions, see the following table. Contact Medical Intelligence for a complete list. For directions on how to use the extensions, refer to the **P10105-152 iBEAM evo Couchtop User Manual**.

Table 29 Standard extensions to the HexaPOD evo RT Couchtop

Extension name	Part number	Extra length	View	Radiation target
iBEAM evo Extension 650	P10105-423	650 mm		Prostate area
iBEAM evo Extension H&N	P10105-413	400 mm		Supra-clavicular area



Do not radiate through the extension mounting area.

8.4.2 Dosimetric Properties

The central baseline attenuations (perpendicular incidence) of the carbon-fibre tabletop of the robotic couchtop and the related extensions were measured in a clinical environment on an Elekta Synergy[®] system in Würzburg, Germany. The following table lists the measurements results.

Phantom	PMMA
Field size	96 × 104 mm
SSD 952 mm	d = 48 mm
PTW Multidose	

Table 30 Dosimetric properties

Component	Attenuation at 6 MV	Attenuation at 10 MV
Carbon-fibre tabletop	2.4%	1.9%

For details on the dosimetric properties of the extensions, refer to the **P10105-152 iBEAM evo Couchtop User Manual**.

Treatment through the carbon-fibre tabletop can increase the skin dose. The skin dose also depends on the beam energy and the treatment plan prescriptions. For further details of the dosimetric properties of the carbon-fibre tabletop, refer to the **P10105-152 iBEAM evo Couchtop User Manual**.



WARNING

- **The radiation attenuation will vary, depending on beam energy and beam entry angle through the carbon-fiber tabletop.**
- **Always make sure that the skin dose levels are within safe limits before you radiate through the carbon-fiber tabletop.**
- **Take the dose attenuation into account when radiating through the carbon-fiber tabletop.**

Areas of solid carbon-fibre inlays

In the areas of the mechanical joints, both of the carbon-fibre tabletop and of the extensions, there are sections of solid carbon fibre. When the radiation beam passes through these areas before entering the patient, unacceptable distortions of the intended dose distribution within the patient can occur. The treatment planning system does not account for these distorted distributions.

Therefore, make sure that the imaging and/or the treatment radiation does not involve these areas. The areas are indicated in the following figure by dotted, red lines. All dimensions in the figure are in millimetres.

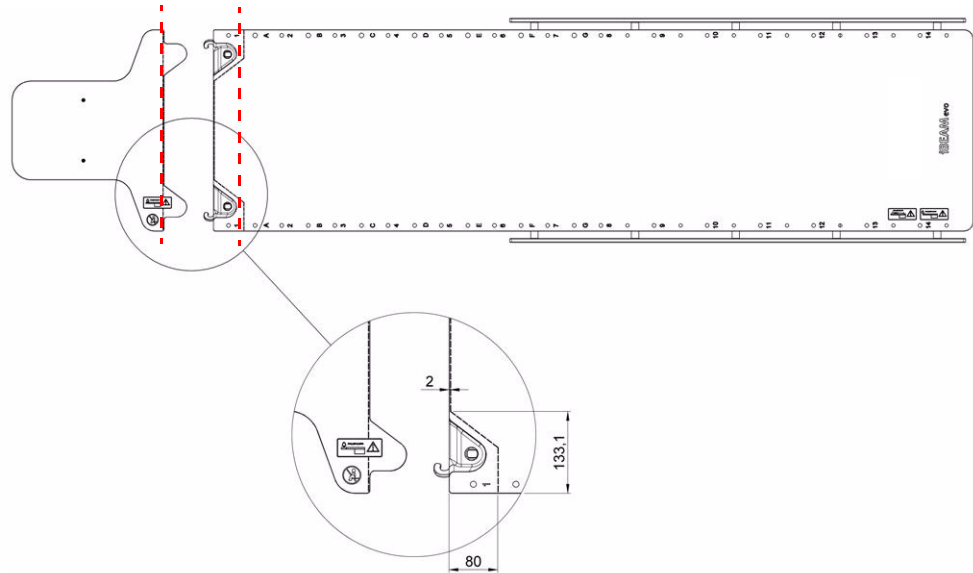


Figure 108 Areas of solid carbon-fibre inlays.

8.5 Handheld Controller

Use the Handheld Controller (HHC) to position the robotic couchtop manually. For a description of how to enable robotic couchtop movements with the HHC, please refer to [Section 3.3.2 Enabling HexaPOD evo RT Couchtop Movements on page 46](#).

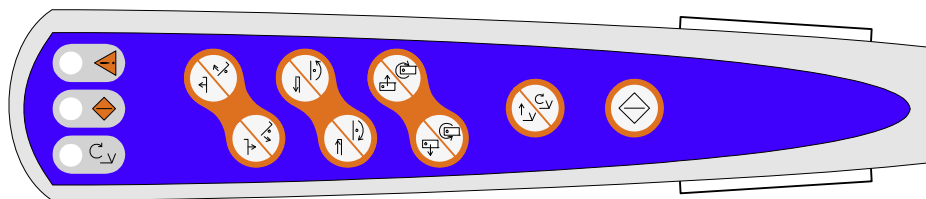



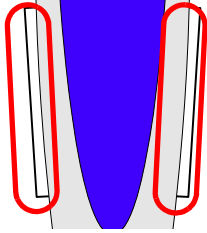
Figure 109 Handheld Controller

The following buttons and LEDs are available on the HHC:

Table 31 Buttons and LEDs on the HHC

Symbol	Description
	ROT/TRANS LED ON: Rotational movements are activated. OFF: Translational movements are activated.
	MOVEMENT PENDING LED ON: A movement has been requested. Press the OPERATE button and the ENABLE buttons to allow the movement to be executed. OFF: No movements pending. The MOVEMENT PENDING LED should light up when you press a movement button.
	Not in use.
	Movement Buttons The label on each button shows the corresponding movement. Press and hold the ENABLE buttons and one of the movement buttons to move the robotic couchtop. The ROT/TRANS LED shows if rotations or translations are active.
	ROT/TRANS button Pressing this button toggles between rotations and translations. The ROT/TRANS LED shows if rotations or translations are active.

Table 31 Buttons and LEDs on the HHC

Symbol	Description
	<p>OPERATE Button</p> <p>The OPERATE button must be pressed with the ENABLE buttons to allow pending movements (indicated by the MOVEMENT PENDING LED) to be execute.</p>
	<p>ENABLE Buttons (2)</p> <p>These buttons must be pressed (and held) together with either the OPERATE button or a movement button to enable movements of the robotic couctop.</p>

Note: *If you fix the HHC at one of the side rails of the robotic couctop, be careful that you safely position it between two fastening bolts of the rail.*

Movement modes

Continuous	When you push one of the Movement buttons simultaneously with one of the Enable buttons, then the robotic couctop moves until it reaches the limit stop of the related axis or until the movement is complete. Once the movement is complete, the Movement Pending LED will go off.
Stepwise	When you briefly push any one of the Movement buttons simultaneously with one of the Enable buttons, then the robotic couctop moves by 0.5 mm into the related direction.

Note: *If any **Movement** button gets stuck while you push it, immediately release all **Enable** buttons.*
*If any **Enable** button gets stuck after release, immediately push the **OFF** button on the Control panel for approximately five seconds (see [Section 8.3 HexaPOD evo RT Couctop on page 128](#)).*

8.6 EnableSwitch Board

The iGUIDE software sends positioning commands to the robotic couchtop. However, the robotic couchtop will not move unless you enable the movement. To enable the movement, **simultaneously** push the two hard-wired **OPERATE** buttons on the ESB which is located in the control room. As soon as you release one or both of them, the robotic couchtop immediately stops any movement.

For ease of operation, put the keyboard of the iGUIDE Workstation on the ESB.

The following buttons and LEDs are available on the ESB:

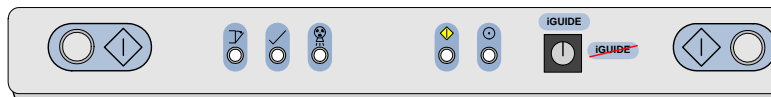


Figure 110 EnableSwitch Board

Table 32 Buttons and LEDs on the ESB

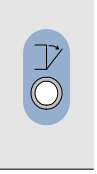


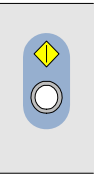
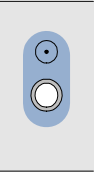
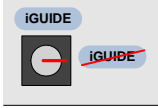
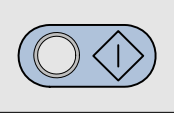
Symbol	Description
	EXTERNAL INHIBIT LED ON: The HexaPOD evo system has set the EXTERNAL INHIBIT signal, which prevents treatments on the Linac. OFF: No interlock (treatment possible). Move the iGUIDE key to iGUIDE OFF to bypass this inhibit.
	LINAC READY LED ON: The robotic couchtop can move (if the TREATMENT BEAM LED is off). OFF: No robotic couchtop movements are possible. The LINAC READY LED includes all safety equipment for preventing movements (for example, the touchguard).
	TREATMENT BEAM LED ON: Linac radiating, no movements of the robotic couchtop possible. OFF: No radiation, the robotic couchtop can be moved (if the LINAC READY LED is on). <i>Note:</i> Watch the TREATMENT BEAM LED on the ESB: If the LED stays OFF during treatment, put the system out of service and call the technician!
	MOVEMENT PENDING LED ON: A movement has been requested and can be enabled. OFF: No movements pending. This LED corresponds to the MOVEMENT PENDING LED on the HHC.
	HexaPOD ON LED ON: The robotic couchtop is on. OFF: The robotic couchtop is off. This LED corresponds to the HexaPOD ON LED on the control panel of the robotic couchtop.

Table 32 Buttons and LEDs on the ESB

Symbol	Description
	<p>iGUIDE Key</p> <p>iGUIDE ON (12 o'clock): The HexaPOD evo system prevents radiation if the patient is not in the final treatment position.</p> <p>iGUIDE OFF (3 o'clock): The HexaPOD evo system cannot raise an inhibit. Additionally, the iGUIDE software is shut down.</p> <p>In the iGUIDE OFF position, treatments can be performed without using the HexaPOD evo system.</p>
	<p>OPERATE Buttons (2)</p> <p>Both of these buttons must be pressed (and held) to enable movements of the robotic couchtop from the control room.</p>

8.7 iGUIDE Tracking System

Power delivery The camera is connected via the powerbox. When it is delivered with power, the **POWER** LED will be on. As soon as the camera is at operating temperature, the status LED will be on.

Note: For positioning with the camera, a warm up period of 30 Minutes must be respected.

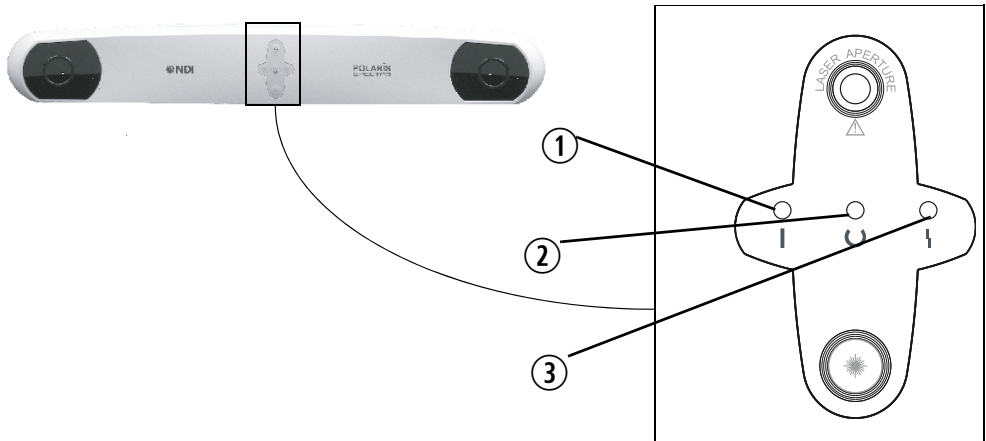


Figure 111 Indicator LEDs of position sensor

- ① **POWER** LED
- ② Status LED
- ③ Error LED

The indicator LEDs have the following meanings:

Table 33 LEDs on the camera

POWER LED	Status LED	Error LED	iGUIDE Tracking System Status
Flashing	Any state	Any state	The position sensor is warming up. The POWER LED will stop flashing and light steady when the position sensor is ready for tracking.
Solid	Solid	Off	The position sensor is ready for use, no faults.
Any state	Any state	Flashing or solid	An error has been detected. The error can only be corrected by a service technician.

Troubleshooting If the **POWER** LED is not on, call a hospital technician to examine the power supply in the treatment room. If there is no error with the power supply in the treatment room, you must call your service representative.

Infrared sources

The camera uses (infrared) light to detect the position of the markers on the reference frame. Because of that,

- light sources that point directly at the camera, and/or
- objects that reflect towards or even focus light at the camera,

can confuse the camera. This can lead to inaccurate patient positioning with the consequence of clinical mistreatment.

Therefore,

- remove all light sources that point at the camera,
- remove all objects that focus or reflect light at the camera,

from the treatment room as long you work with the iGUIDE software. If it is not possible to remove these light-emitting objects, then make sure that the camera is far off the focus of these objects. In case of uncertainty, do not hesitate to contact the physician on duty or the administrator of the iGUIDE software.



- **When you work with the HexaPOD evo RT System, make sure that there no other optical markers (for example, a second reference frame) are within the field of view of the camera.**
- **Make sure that the camera is powered for at least 30 minutes before you perform the daily safety checks.**
- **The camera uses IR light for tracking. Ensure that all other light sources and objects that point or reflect light at the camera are removed or disabled while you work with the iGUIDE software. Other optical tracking systems must also be disabled.**

8.8 iGUIDE Reference Frame

The reference frame is installed on the robotic couchtop. The camera finds the accurate patient position tracking the six optical markers on the top side of the reference frame. The optical markers are arranged in a specified geometric pattern, see ① in [Figure 112](#).

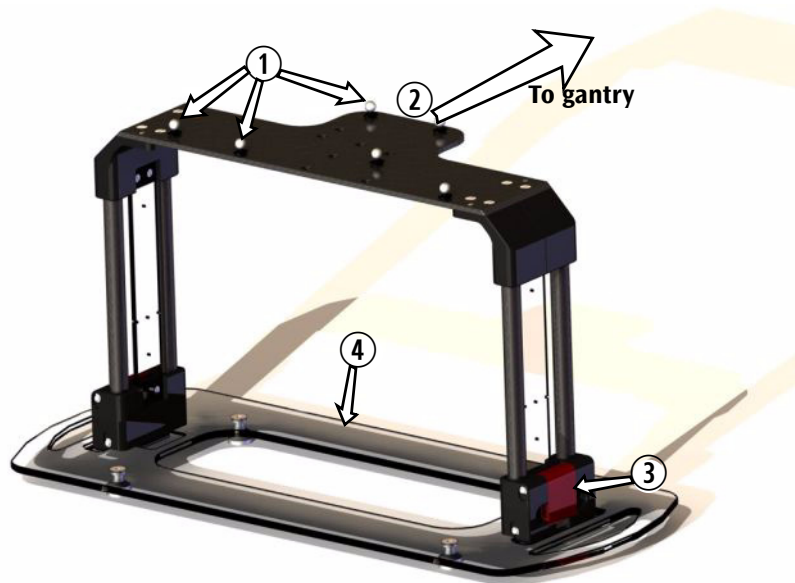


Figure 112 The iGUIDE Reference Frame

- ① Optical marker (total of six)
- ② Nose - points always towards the gantry
- ③ Locking lever (red)
- ④ Bottom Plate (for storing the reference frame safely)

Note:

Always handle and store the reference frame carefully in order to maintain the integrity of the reference frame and the arrangement of the optical markers.

Do not touch the optical markers on the reference frame. The arrangement of the markers can be disturbed and their reflective quality can be lost.

For additional information on the optical markers refer to the

- **System Guide for the iGUIDE Tracking System**
i.e. Passive Polaris Spectra User Guide, Northern Digital Inc., Waterloo, Canada
(www.ndigital.com).



Do not touch, drop or otherwise damage the optical markers.

How to mount the reference frame

- 1 Lift up the levers on both sides of the reference frame.



Figure 113 Lifting the securing levers

- 2 Position the reference frame over the desired slot (slots ① – ⑥ are available), use the slot which will be as closest to isocenter as possible.

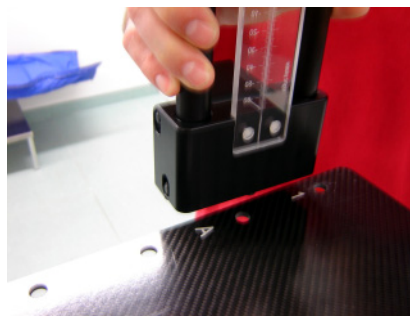


Figure 114 Positioning the reference frame

- 3 Lower the reference frame completely into the mounting holes. It will only fit if it is correctly oriented.

Note that the “nose” of the reference frame must be pointed to the gantry (see [Figure 112 on page 140](#)).

- 4 Push down the securing levers on the reference frame. Do not force them into place.

The securing levers should be flush with the reference frame.

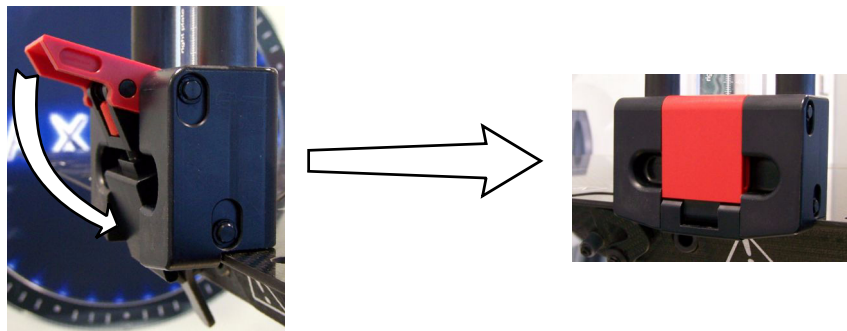


Figure 115 Securing the reference frame



WARNING

Always make sure that the reference frame is mounted correctly and the mounting system is firmly locked.

How to remove the reference frame

- 1 Grab the red locking lever through the cutouts in the base of the reference frame and lift it up fully, see the following figure.
Repeat this on the opposite side of the reference frame.

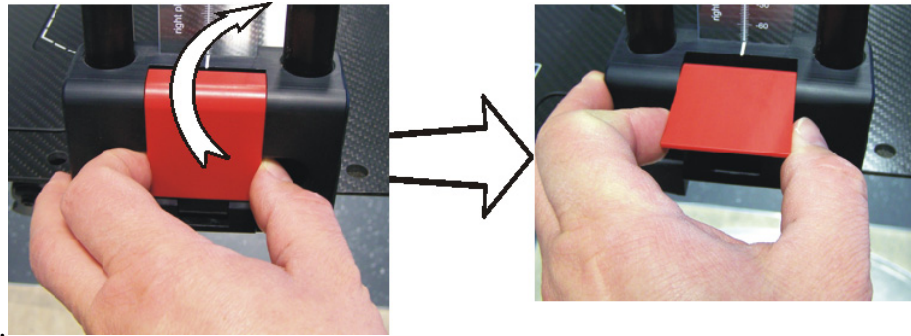


Figure 116 How to disengage the locking levers of the reference frame

- 2 Carefully remove the reference frame from the robotic couch top.
- 3 Put the reference frame on the Bottom Plate and store it in a safe place.

8.9 iGUIDE Calibration Tool

The calibration tool (see ① in the figure below) is used to perform the system calibration procedure, which is given in detail in the **09-001-1078 HexaPOD evo RT System; iGUIDE 2.0 Set-to-Work Manual**.

The following figure shows the calibration tool with the Indexing Bar ② fixed at slot B.

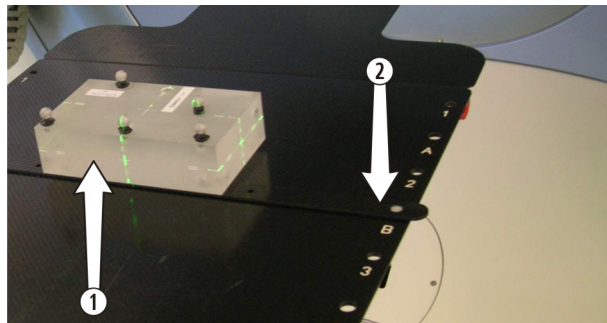


Figure 117 The iGUIDE Calibration Tool



Do not touch, drop or otherwise damage the optical markers.

Note:

The calibration tool is not used within the clinical workflow of the HexaPOD evo RT System.

8.10 iGUIDE Workstation in the Control Room

The iGUIDE workstation is installed in the control room. It provides the PC with the iGUIDE software.

In order to use the iGUIDE software you must start the PC by pressing the **Power ON** button.

To start and operate the iGUIDE software refer to [Section 3.2 Operating the iGUIDE Software on page 41ff.](#)

The PC provides also a backup system which is activated when the iGUIDE workstation is shut down.

Note:

In order to provide regular backups the PC of the iGUIDE workstation must be shut down at the end of the day.

8.11 iGUIDE Terminal in the Treatment Room

The iGUIDE terminal is installed in the treatment room. It is connected through a KVM Extender bridge to the iGUIDE workstation in the control room.

The iGUIDE workstation can be operated from the iGUIDE terminal.



Only one person may control the HexaPOD evo RT System and its components at one time. Treatment personnel in the treatment room must have priority. Do not perform movements of the robotic couchtop from the control room until all treatment personnel has left the treatment room.

8.12 User Repairable Parts

The HexaPOD evo RT System does not contain any parts that users can repair. Therefore, always leave the corrective maintenance tasks to qualified and service engineers.

8.13 Cleaning and Disinfecting

Always clean the components of the HexaPOD evo system according to the hygiene regulations of the treatment environment and at specified time intervals. Cleaning and disinfection techniques for the equipment and the rooms must comply with all applicable local laws and regulations which have the force of law in the jurisdiction where the equipment is being used.



WARNING

Disinfect the robotic couhtop according to clinical standards before and after each treatment, especially after direct contact with body fluids. Pay extra attention to the extension mounting area.

Permitted cleaning agents

- hand-applied, water-based detergents with the addition of a non-corrosive biocide



CAUTION

Never use corrosive or chlorine bleach based cleaning agents, solvents or abrasive detergents. Do not use sprays for disinfection because the vapours may penetrate and damage the equipment. If you are not sure about the properties of a cleaning agent, do not use it. Immediately dry all surfaces after cleaning.

How to clean and disinfect the surfaces that come into contact with patients

- Moisten a soft, clean, and lint-free cloth with a permitted cleaning agent.
- With the moistened cloth, wipe all surfaces that come into contact with patients.
- Alternatively, you may also use denaturated alcohol (ethanol) lint-free wipes.
- When parts of the HexaPOD evo system get in direct contact with body fluids, then disinfect it. Pay additional attention to the areas of the mechanical joints, both of the carbon-fibre tabletop and of the extensions.
- In any case, make sure that you dry all surfaces afterwards with a soft, clean, and lint-free cloth.

Dusting of the equipment

Use a soft, lint-free cloth to remove any dust from:

- the robotic couhtop. For further information, refer to the **P10105-152 iBEAM evo Couchtop User Manual**,
- the HHC,
- the iGUIDE terminal in the treatment room and the iGUIDE workstation in the control room, including keyboard and mouse. Remove dust and fingerprints from the VDU by using a recommended cleaning fluid.

8.14 Final Disposal

Final disposal means the disposal of the equipment or any part of it in such a way that it can no longer be used for its intended purpose(s). Prior to disposal, always contact Medical Intelligence for advice and for a list of the substances that require specialist attention. For contact details, see the inner cover page.

Always do the disposal in an environmentally sensitive manner that complies with all local and international regulations and laws. You must separately remove all materials that can be hazardous to human health and/or to the environment. Dispose these materials of through competent, licensed facilities. The remaining material may be recycled, where facilities and local regulations permit this.

Never dispose of Medical Intelligence products in the domestic waste stream.

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Appendix A

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A.1 Technical Data

A.1.1 HexaPOD evo RT Couchtop

Table 34 Technical data of the HexaPOD evo RT Couchtop

Dimensions (L × W × H)	2 042 × 530 × 199 mm
Weight	102 kg
Power supply	48 V DC
Max. power consumption	800 W
Safe workload	200 kg
Tabletop material	carbon-fibre-reinforced plastics

A.1.2 HexaPOD Powerbox

Table 35 Technical data of the HexaPOD Powerbox

Dimensions (L × W × H)	380 × 380 × 210 mm
Weight	< 20 kg
Input voltage	100 – 240 V AC (-15%; +10%)
Communication interfaces	RS-232, RS-422, TCP/IP

A.1.3 iGUIDE Tracking System

Table 36 Technical data of the camera

Dimensions (L × W × H)	61.3 × 104 × 86 mm
Weight	1.9 kg
Supply voltage	18 – 32 V DC
Mounting	Universal Ceiling Mount (UCM)

A.1.4 iGUIDE Workstation

iGUIDE Workstation Computer

Table 37 Technical data of the iGUIDE Workstation computer

Type	Midi tower personal computer
Weight	< 15 kg
Input voltage	115 or 230 V AC (±10% / IEC 60038); 50 – 60 Hz

iGUIDE Workstation Monitor

Table 38 Technical data of the iGUIDE workstation monitor

Type	Standard 17" TFT/VGA monitor
Input voltage	100 – 230 V AC (±10% / IEC 60038); 50 – 60 Hz

iGUIDE Terminal Monitor

Table 39 Technical data of the iGUIDE terminal monitor

Type	Standard 19" TFT/VGA monitor
Input voltage	100 – 230 V AC ($\pm 10\%$ / IEC 60038); 50 – 60 Hz
Mounting interface	VESA100 (100 × 100 mm)

A.1.5

KVM Extenders

The local KVM Extender is located in the control room; the remote KVM Extender is located in the treatment room. The following table lists the common technical data of both KVM Extenders.

Table 40 General technical data of the KVM Extenders

Component connectors	VGA, USB
Connection cable between the KVM Extenders	CAT-5

Local KVM Extender (Control Room)

Table 41 Technical data of the local KVM Extender

Dimensions (L × W × H)	120 × 110 × 29 mm
Weight	0.7 kg

Remote KVM Extender (Treatment Room)

Table 42 Technical data of the remote KVM extender

Dimensions (L × W × H)	138 × 98 × 29 mm
Weight	0.7 kg
Supply voltage	9 V DC
PSU input voltage	100 – 230 V AC ($\pm 10\%$ / IEC 60038), 50 – 60 Hz

A.1.6

Isolation Transformers

Isolation Transformer - Treatment Room

Table 43 Technical data of the isolation transformer - treatment room

Type	REOMED 300
Dimensions (L × W × H)	240 × 150 × 85 mm
Supply voltage	100, 115 or 230 V AC (nominal); 50 – 60 Hz
Capacity rating	300 VA
Number of outlets	4

Isolation Transformer - Control Room*Table 44 Technical data of the isolation transformer - control room*

Type	REOMED 600
Dimensions (L × W × H)	270 × 170 × 95 mm
Supply voltage	100, 115 or 230 V AC (nominal); 50 – 60 Hz
Capacity rating	600 VA
Number of outlets	6

A.1.7**iGUIDE Reference Frame, iGUIDE Calibration Tool***Table 45 Technical data of the reference frame and calibration tool*

Reference frame material	carbon-fibre-reinforced plastics (CFRP), PVC
Calibration tool material	Perspex Plexiglas GS (PMMA)

A.2 Electromagnetic Compatibility

A.2.1 Cables and Accessories that Maintain Compliance

The following table shows the cables that must be used together with the HexaPOD evo RT System in order to make sure that it is compliant with the emissions and immunity requirements of IEC 60601-1-2.

Table 46 Cables allowed

ID	Name	MI part number	Type	Shielded
HX-4	Interlock connection cable	03.011.0010	Unitronic LiYCY	no
HX-5	Mains power cable	03.011.0011	Ölflex 191CY	yes
HX-6	HexaPOD communication cable	03.011.0012	Unitronic LiYCY	yes
HX-7	HexaPOD power cable	03.011.0013	Ölflex 191CY	yes
HX-8	Ground (earth) cable	03.011.0015	Lapp Multistandard 1 x 4.0 mm ²	no
M03	Interlock T-cable	03.011.0014	12 x 0.24 mm ²	no
HX-10	Doors 3 interlock connection cable	03.011.0021	2 x 0.75 mm ²	no
HX-11	EnableSwitch Board connection cable	03.011.0022	Unitronic LiYCY	yes
HX-12	Tracking System communication cable	03.011.0023	Unitronic LiYCY	yes

A.2.2 Guidance and Manufacturer's Declaration for EME

The HexaPOD evo RT System is intended for use in an electromagnetic environment as listed below. Make sure it is only used within such an environment.

Table 47 Required electromagnetic environment

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions (CISPR 11)	Group 1	The HexaPOD evo RT System uses RF energy only for its internal functions. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions (CISPR 11)	Class B	The HexaPOD evo RT System is suitable for use in all facilities, including residential buildings and those facilities that are directly connected to the public mains network that supplies residential buildings.
Harmonic emissions (EN 61000-3-2)	Class A	
Flicker (EN 61000-3-3 + A1)	Compliant	

A.2.3 Guidance and Manufacturer's Declaration for EMI

The HexaPOD evo RT System is intended for use in an electromagnetic environment that meets the requirements listed in the following tables.


General EMI requirements

Table 48 General EMI requirements

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) (IEC 61000-4-2)	± 6 kV contact ± 8 kV air		Floors should be wood, concrete, or ceramic. If floors are covered with synthetic material, relative humidity should be at least 30%.
Electrical fast transient / burst (IEC 61000-4-4)	± 2 kV for power supply lines ± 1 kV for I/O lines		Mains power quality should be that of a typical commercial or hospital environment.
Surge (IEC 61000-4-5)	± 1 kV differential mode ± 2 kV common mode		Mains power quality should be that of a typical commercial or hospital environment.
Dips / Interruptions / Variations on power supply input (IEC 61000-4-11)	$<5\%$ U_t for 0.5 cycles ($>95\%$ dip in U_t) $<40\%$ U_t for 5 cycles (60% dip in U_t) $<70\%$ U_t for 25 cycles (30% dip in U_t) $<5\%$ U_t for 5 s ($>95\%$ dip in U_t)		Mains power quality should be that of a typical commercial or hospital environment. If the user of the HexaPOD evo RT System requires continued operation during power mains interruptions, it is recommended that the HexaPOD evo RT System be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field (IEC 61000-4-8)	3 A/m		Power frequency magnetic fields should be at levels characteristic of a typical location in a commercial or hospital environment.
NOTE: U_t means the rated AC mains voltage prior to the application of the test level.			

Requirements for non life-supporting equipment

Table 49 Requirements for non life-supporting equipment

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
<p>Conducted RF (IEC 61000-4-6)</p> <p>Radiated RF (IEC 61000-4-3)</p>	<p>3 V_{rms} [150 kHz to 80 MHz] outside ISM bands</p> <p>3 V/m [80 MHz to 2.5 GHz]</p>	<p>3V</p> <p>3 V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the HexaPOD evo RT System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended Separation Distance:</p> $d = \left[\frac{3.5}{3} \right] \sqrt{P}$ $d = \left[\frac{3.5}{3} \right] \sqrt{P} \quad \text{for 80 MHz to 800 MHz}$ $d = \left[\frac{7}{3} \right] \sqrt{P} \quad \text{for 800 MHz to 2.5 GHz}$ <p>where <i>P</i> is the nominal output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey^a, should be less than the compliance level in each frequency range^b.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

NOTE 1: At 80 MHz and 800 MHz, the limits for the higher frequency range apply.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption, and reflection from structures, objects and people.

- a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcasts and TV broadcast cannot be predicted theoretically with accuracy. To access the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HexaPOD evo RT System is used exceeds the applicable RF compliance level above, the HexaPOD evo RT System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the HexaPOD evo RT System or the transmitting device from which it is receiving signals.
- b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended Separation Distances

Table 50 Recommended separation distances

Transmitter RF output power [W]	Recommended separation distance d [m], for the frequency ranges		
The HexaPOD evo RT System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the equipment can help to prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the components of the HexaPOD evo RT System as recommended in the table below. The recommended separation distance depends on both the rated maximum transmitter RF output power and the transmitter frequency of the communications equipment.			
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = \left[\frac{3.5}{3} \right] \sqrt{P}$	$d = \left[\frac{3.5}{3} \right] \sqrt{P}$	$d = \left[\frac{7}{3} \right] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1.0	1.17	1.17	2.33
10	3.69	3.69	7.38
100	11.67	11.67	23.33
For transmitters rated at a maximum output power not listed above, you can estimate the recommended separation distance d [m]. To do so, use the applicable formula, dependent on the transmitter frequency. In this formula, P is the maximum output power rating of the transmitter [W] according to the transmitter manufacturer.			
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.			
NOTE 2: These guidelines may not apply to all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

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www.elekta.com

Corporate Head Office:

Elekta AB (publ)
Box 7593, SE-103 93 Stockholm, Sweden

Tel +46 8 587 254 00
Fax +46 8 587 255 00
info@elekta.com

Regional Sales, Marketing and Service:

North America
Atlanta, USA

Tel + 1 770 300 9725
Fax + 1 770 448 6338
Info.america@elekta.com

**Europe, Latin America, Africa,
Middle East & India**

Tel +44 1293 544 422
Fax +44 1293 654 321
info.europe@elekta.com

Asia Pacific
Hong Kong, China

Tel +852 2891 2208
Fax +852 2891 7133
info.asia@elekta.com



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